SOCIO-ECONOMIC ASSESSMENT OF TIMBER SUPPLY SCENARIOS FOR THE GOLDEN TSA

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EXECUTIVE SUMMARY

INTRODUCTION

- The BC Ministry of Forests (MoF) is conducting a province-wide timber supply review which is assessing the short and long-term effects of forest management practises in BC. As part of the review process, MoF has recently examined the availability of timber in the Golden Timber Supply Area (TSA) [Integrated Resources Branch, MoF, 1993]. The completion of the Timber Supply Analysis report has led to the preparation of this socio-economic impact assessment of the effects of selected timber supply scenarios on communities within the TSA and throughout the province. It is the objective of this study to evaluate, using a multiple accounts methodology, the economic, environmental and social impacts of three alternative harvest scenarios.

- Multiple accounts analysis is a framework for evaluating the diverse values inherent in a particular resource (in this case the forest land base). The purpose of the analysis is to clearly identify the regional and provincial implications of the alternative harvest scenarios for each account.

SOCIO-ECONOMIC PROFILE

Geography

- The Golden Timber Supply Area (TSA) covers 921 231 hectares and is one of seven TSAs comprising the Nelson Forest Region. The TSA is administered by the Golden Forest District office in Golden.

- The Golden TSA lies within the Rocky Mountain Trench, cradled between the Rocky Mountains to the east and the Selkirk and Purcell ranges to the west. The Golden TSA is bordered by five national parks (Kootenay, Yoho, Banff, Jasper, and Glacier) and one provincial park (Hamber).

- The forested area has a varied climate and diverse ecology. It is located within the interior wet belt and classified into the moister biogeoclimatic zones: Engelmann Spruce-Subalpine Fir, and Interior Cedar-Hemlock. Montane Spruce and Interior Douglas-fir zones are also represented, but only over a relatively minor range. The

region supports a variety of mature, commercial tree species, with spruce, lodgepole pine and red cedar predominant. Hemlock, balsam and Douglas-fir are less common but still commercially valuable species.

Communities and Economic Activity

- The Town of Golden is the only sizeable population centre within the Golden TSA. The other community is Donald Station, located 20 kilometres north of Golden on the TransCanada Highway. In 1991, the population of Golden and the surrounding area within the TSA, was 6 845. Since 1981, the population has increased 6.7 per cent.

- Golden is highly reliant on forestry to sustain its economic base. According to the Ministry of Finance and Corporate Relations, in 1990, 56 per cent of the basic sector income (i.e. related to exports from the region) in Golden was derived from forestry activity. In comparison, eight per cent was derived from tourism. Of the 55 BC areas studied, only Hazelton and Vanderhoof were more dependent on forestry than Golden.

- Evans Forest Products Limited dominates production and is responsible for the vast majority of forestry employment in the TSA. The company has two mills in the region, a sawmill in Donald and a plywood mill in Golden. Employment at the two mills was 175 and 217 PYs, respectively, in 1992. In 1992, Evans employed 85 PYs in woodlands and administration positions, and supported a further 285 PYs in contract employment relating to quota and purchase volumes. Total direct employment attributable to Evans was 762 PYs, representing about 20 per cent of the total labour force. Of the 762 PYs, approximately 360 were related specifically to the harvesting of Evans' Forest Licence.

- Evans relies largely on Golden TSA wood for its mills. In 1992, the plywood mill obtained 87 per cent of its wood from the TSA, and the sawmill 74 per cent.

- Evans' Forest Licence supplied 54 per cent of its milled volume, while 46 per cent came from other sources both inside and outside the TSA. In addition to its Forest Licence volumes, Evans has historically purchased significant volumes of Small Business Forest Enterprise Program (SBFEP) and private wood.

- Because non-Forest Licence volumes make up a significant portion of the mills' input, reductions in available Timber Licence and purchased volumes from private land, both inside and outside the TSA, have implications for the viability of Evans' plants. These impacts are over and above the impacts associated with the timber supply scenarios examined in this report.

- In the next few decades, the majority (about 70 per cent) of the timber harvest will have to come from the northern portion of the TSA. This will involve more summer logging, due to limited winter access in the north. In addition, there is likely to be an increase in steep slope logging in the future.

- Tourism is the second major industry in Golden and the fastest growing. The mountainous nature of the region and the diversity of natural attributes are attracting an increasing number of wilderness/adventure tourists each year and helping to build a more diverse tourism industry.

- There are between 85 and 100 businesses in the Golden area catering to tourism markets. The industry in Golden was estimated to have generated $32 million in direct tourism purchases in 1991 [Golden Team Action Committee, 1992]. Total tourism employment is believed to be approximately 562.

- Of the other economic sectors in Golden, transportation and services are the most significant. The transportation sector is still in the midst of job reductions as a result of CPR downsizings. The service sector, however, is growing rapidly.

Aboriginal Community

- The Golden TSA lies within the traditional lands of the Shuswap Nation. The Ktunaxa/Kinbasket Tribal Council, of which the Shuswap Band is a member, has submitted a comprehensive land claim covering the entire southeast corner of the province. There is no firm timetable either for negotiations or for settlement. There are no reservations, no aboriginal communities, and no identifiable aboriginal populations within the Golden TSA. There is no subsistence activity in the TSA, such as fishing or trapping. There is no aboriginal employment in the forest workforce in Golden.

Environment

- The majority of the TSA is comprised of rugged and steep valleys, with extensive alpine glaciers in the northern portion and broader valley bottoms in the south. The high elevation habitats are generally abundant and unthreatened. Spruce-fir forests are being reduced through timber harvesting, but are also found in inaccessible, inoperable and park areas (which are outside the TSA boundaries). Most low elevation habitats are threatened by human activity, with wetlands and riparian valley bottom forests occurring rarely. Old growth components have been logged most heavily in the valley bottom areas of the TSA. The majority of Cedar-Hemlock old growth forests will have been logged in the next 30 to 40 years.

- A wide variety of wildlife species inhabit the area: approximately 274 species of birds, 63 of mammals, nine of amphibians, and eight of reptiles. Among the more recognized species which are threatened in the region are peregrine falcon, bald eagle, great blue heron, grizzly bear, caribou, and fisher.

Recreation

- Local recreation activities include boating, camping, hunting, fishing, hiking, mountain biking, kayaking, hang-gliding and para-gliding, bird watching, and wildlife viewing. In the winter, snowmobiling and cross-country skiing are popular pursuits.

TIMBER SUPPLY SITUATION

Allowable Annual Cut

- The current Allowable Annual Cut (AAC) for the Golden TSA is 650 000 m^3, set by the Chief Forester in January 1981. There are two Forest Licences, one held by Evans (473 263 m^3) and the other held by Wood River Forest Inc. (61 533 m^3). Evans processes its wood in Golden, while Wood River processes in Revelstoke.

Timber Harvest Scenarios

- The long-run harvest level for the TSA is 309 000 m^3. All three harvest scenarios achieve this harvest through different reduction schedules, as shown in Table ES-1.

Scenario 1 begins with a harvest of 605 000 m^3, a seven per cent decrease from today's AAC. Thereafter, the harvest declines by 10 per cent for each of the first seven decades until the long-term harvest level is reached.

- The initial harvest level of Scenario 2 is 650 000 m^3, declining by 14 per cent to 559 000 m^3 in the second decade. The long-term harvest level is reached in year sixty.

- The third scenario sees an immediate reduction of 166 000 m^3, then maintains a constant harvest level for forty years, while limiting the decline in succeeding decades to 10 per cent. The long-term harvest level is reached in year 80.

TABLE ES-1: Harvest Scenarios

Harvest Period	Scenario 1		Scenario 2		Scenario 3	
	Harvest '000m^3	% Change	Harvest '000m^3	% Change	Harvest '000m^3	% Change
Current	650	-	650	-	650	-
Year 0	605	(6.9)	650	0.0	484	(25.5)
Year 10	543	(10.2)	559	(14)	484	0.0
Year 20	486	(10.5)	490	(12.3)	484	0.0
Year 30	436	(10.3)	428	(12.7)	484	0.0
Year 40	390	(10.5)	374	(12.6)	431	(10.9)
Year 50	349	(10.5)	326	(12.8)	388	(10.0)
Year 60	313	(10.3)	309	(5.2)	348	(10.3)
Year 70	309	(1.3)	309	0.0	311	(10.6)
Year 80	309	0.0	309	0.0	309	(0.6)

- Development Plans and Annual Reports received by the MoF from timber operators in the Golden TSA indicate that the merchantable volumes used in the timber supply scenarios for mature stands to be harvested are optimistic. If this is the case, there could be greater impacts on timber supply over the next 10 to 40 years than is shown in the harvest scenarios.

TSA IMPACTS

- The TSA impacts for all three scenarios are summarized in the Table ES-2.

Table ES-2: Summary of TSA Accounts

		Scenario 1				Scenario 2				Scenario 3			
		Years from Present				Years from Present				Years from Present			
		0	10	20	60	0	10	20	60	0	10	20	60
Harvest in '000 m³		605	543	486	313	650	559	490	309	484	484	484	348
Economic Account													
Employment (PY/Year)	Direct	575	516	462	297	618	531	466	294	460	460	460	331
	Indirect	454	407	365	235	488	419	368	232	363	363	363	261
	Total	1 029	923	827	532	1 106	950	834	526	823	823	823	592
Employment Income ($1992 Millions/Year)	Direct	$17.4	$15.6	$14.0	$9.0	$18.7	$16.1	$14.1	$8.9	$13.9	$13.9	$13.9	$10.0
	Indirect	9.6	8.6	7.7	5.0	10.3	8.8	7.8	4.9	7.7	7.7	7.7	5.5
	Total	$27.0	$24.2	$21.7	$14.0	$29.0	$24.9	$21.9	$13.8	$21.6	$21.6	$21.6	$15.5
Community Account													
Population		• little or no change				• no change				• some short term outmigration			
Local Government		• no change				• no change				• slightly adverse in short term if mill closes			
Social Fabric		• minor impact				• minor impact				• some increased short term demand for employment, training and other social services			
Environmental Account													
Habitats		• widespread conversion of old growth forests to younger forests, especially at lower elevations				• widespread conversion of old growth forests to younger forests, especially at lower elevations				• same long-term impacts as scenarios 1 and 2; however, affords the greatest short-term (first 20 years) flexibility for managing the forest for biological diversity			
Wildlife		• some short term enhancement of some ungulates; long term declines in key big game and old growth dependent species				• some short term enhancement of some ungulates; long term declines in key big game and old growth dependent species							
Aboriginal Account		• no impact				• no impact				• no impact			

Economic Development

- In Scenario 1 direct employment would fall immediately from the current level of 618 PYs to 575 PYs, a drop of seven per cent. A further 34 PYs of associated indirect jobs are lost, for a total of 77 job losses in the first decade. The corresponding total employment income losses would be $2.0 million. Between year 10 and year 70, total cumulative job loss would be 580.

- Scenario 2 starts at the current harvest level, so no initial job losses or employment income losses would occur. Total direct and indirect employment would remain at 1 106 and employment income at $29.0 million. Compared to total employment in Scenario 1 (1 029) and Scenario 3 (823), the first decade impacts of Scenario 2 are much more favourable in the short-term. Some significant adjustments would occur between years 10 and 60, however, as total jobs would be more than halved, from 1 106 down to 526.

- Under Scenario 3, there would be an immediate job loss of 283 direct and indirect jobs, and an associated employment income loss of $7.4 million. Job losses could be significantly higher if the harvest decline forced one or both of Evans' mills below threshold levels (see Appendix 7). After the initial harvest decline, no changes in jobs or income would occur for the next forty years, as harvests would be maintained at 484 000 m^3. By year 40, the total cumulative job loss of 283 would be less than the job loss experienced in Scenarios 1 or 2. After year 40, harvests again are projected to decline by approximately 10 per cent per decade.

- A continuation of existing harvesting practices is unlikely to affect many (but not all) recreational attributes in the Golden TSA. Wildlife viewing and hunting could benefit in the short-term, especially under scenarios 1 and 2, if road closures do not impede access. In the long-term, however, loss of biodiversity under all three scenarios could negatively impact these activities.

- The relationship between timber harvesting and tourism activities in the Golden TSA is poorly understood. While continued harvesting may negatively affect key tourism attributes and thereby cause job and income losses, how and when this could occur is unknown.

Environmental Impacts

- There would be little difference among the three scenarios regarding their long-term impacts on the environment. This is because over the long-term the same level of harvesting occurs under each scenario. However, Scenario 3 has a lower harvest in decades one and two, and therefore affords the greatest short-term flexibility for managing the forest for non-timber values. This would keep more options open if it is decided to further reduce the timber supply in decades four through seven in order to place more emphasis on management of non-timber resources.

- Under Scenarios 1 and 2, there would be some short-term increases in early successional species. BC Environment staff state that in the long-term, a decline in biodiversity, including local extirpation of many old growth dependent species, would be expected. Under Scenario 3, these environmental impacts are expected to be smaller in the first two decades, but greater in decades four through seven.

- Under all three scenarios, there would be a marked shift in the age-class distribution of forests within the TSA. Within four decades, most of the net operable mature forests in the TSA would be converted to immature forests by timber harvesting activities. The most productive forests within the TSA, regarding biological diversity, occur within the net operable area. The end result would be a decrease in the most productive, mature forest stands and an overall reduction in the natural diversity of forests. The widespread conversion of mature forests to immature forests would cause changes in the distributions and population levels of many wildlife species. Adaptable species that can use a wide range of habitat types, such as snowshoe hare, porcupine and dark-eyed junco, and species which use only immature forests, such as the orange-crowned warbler and the fox sparrow, would likely increase in numbers. However, species dependent on mature and old-growth forests would decline. The greatest declines are expected to occur among species that have exacting habitat requirements, such as caribou and cavity nesting birds.

Community Impacts

- Recent responses to changes in employment in the region indicate that there would be relatively minor or no population changes in the short-term under either Scenario 1 or 2. Under Scenario 3 there would be a more dramatic decline in harvest and some resulting population loss in the first 20 years. In the mid-term (year 30 to

year 60) population losses would be higher under Scenarios 1 and 2 than Scenario 3. In the long-term there would probably be minor differences among the scenarios.

- In the short-term, it is unlikely that Scenario 1 or 2 would result in a mill closure; therefore, there would be no change in the industrial tax base in the community. Moreover, job loss would not be enough to adversely affect property markets or municipal tax revenues. Scenario 3 could lead to mill closure and population loss in the short-term, but these have not been factored into the economic impacts. The cumulative effects of a mill closure could have a significant impact on local government revenue. In the medium term (following year 20), Scenarios 1 and 2 also involve the possibility of mill closure.

- Scenarios 1 and 2 would not lead to significant social effects in Golden, judging from the effects of layoffs at Evans and CP Rail. Social indicators such as crime rates indicate that Golden is a very stable community. Depending upon the severity of layoffs associated with Scenario 3, the social impacts could be more severe and could lead to increased demand for social services.

Aboriginal Impacts

- There is no aboriginal population or identifiable aboriginal commercial activity in the Golden TSA at present. There are, therefore, no regional aboriginal employment, income, subsistence, or social impacts of the harvest scenarios.

- The potential impact of harvesting on the Ktunaxa/Kinbasket Tribal Council land claim in the region is unknown.

- The major aboriginal impacts of the harvest scenarios would be on historical and cultural sites, of which there are an unknown number.

PROVINCIAL IMPACTS

- The provincial impacts of the three scenarios are summarized in the Table ES-3.

Economic Development/Provincial Revenues

- In Scenario 1, total provincial employment would fall immediately from 1 730 to 1 610, a drop of 120. The employment income loss would be $3.1 million, annually.

Provincial government revenues would decline by $1 million per year. By the time the long-run harvest level is reached in the seventh decade, a total of 908 jobs, $23.0 million in employment income, and $6.3 million in revenues will have been lost to the province.

- Scenario 2 results in the short-term preservation of present levels of provincial employment and employment income. However, the losses thereafter are rapid as all employment, income, and revenue losses occur by year 60.

- Scenario 3 results in a dramatic decline of 442 jobs, $11.2 million in employment income, and $3.6 million in provincial government revenues in the first decade. However, there would be no further declines until year 50.

Table ES-3: Summary of Provincial Accounts - Golden TSA

		Scenario 1				Scenario 2				Scenario 3			
		Years from Present				Years from Present				Years from Present			
		0	10	20	60	0	10	20	60	0	10	20	60
Harvest in m^3		605	543	486	313	650	559	490	309	484	484	484	348
Economic Account													
Employment (PY/Year)	Direct	644	578	517	333	692	595	522	329	515	515	515	370
	Indirect	966	867	776	500	1 038	893	782	493	773	773	773	556
	Total	1 610	1 445	1 293	833	1 730	1 488	1 304	822	1 288	1 288	1 288	926
Employment Income ($1992 Millions/Year)	Direct	$19.5	$17.5	$15.7	$10.1	$21.0	$18.0	$15.8	$10.0	$15.6	$15.6	$15.6	$11.2
	Indirect	21.2	19.0	17.0	11.0	22.8	19.6	17.2	10.8	17.0	17.0	17.0	12.2
	Total	$40.7	$36.5	$32.7	$21.1	$43.8	$37.6	$33.0	$20.8	$32.6	$32.6	$32.6	$23.4
Provincial Revenue Account ($1992 Millions/Year)													
Stumpage & Royalties		$5.4	$4.9	$4.3	$2.8	$5.8	$5.0	$4.4	$2.8	$4.3	$4.3	$4.3	$3.1
Personal Income Taxes		4.1	3.7	3.3	2.1	4.4	3.8	3.3	2.1	3.3	3.3	3.3	2.3
Other Taxes		3.5	3.2	2.8	1.8	3.8	3.2	2.8	1.8	2.8	2.8	2.8	2.0
Total		$13.0	$11.8	$10.4	$6.7	$14.0	$12.0	$10.5	$6.7	$10.4	$10.4	$10.4	$7.4

1.0 INTRODUCTION

1.1 BACKGROUND

The BC Ministry of Forests (MoF) is conducting a province-wide timber supply review which is assessing the short and long-term effects of forest management practises in BC. The Timber Supply Review process will generate four reports for each Timber Supply Area (TSA): a timber supply analysis report; a socio-economic assessment of timber supply scenarios; a discussion paper based on the first two studies; and, a report outlining the Chief Forester's determination of the Allowable Annual Cut (AAC), and the reasoning behind it. As part of the review process, the MoF has recently examined the availability of timber in the Golden Timber Supply Area [Integrated Resources Branch, MoF, 1993]. The completion of the Timber Supply Analysis has led to the preparation of this socio-economic impact assessment of the effects of selected timber supply scenarios on communities within the TSA and on the province as a whole. It is the objective of this study to evaluate, using a multiple accounts methodology, the economic, environmental and social impacts of the alternative harvest rate scenarios.

1.2 METHODOLOGY

Multiple accounts analysis is a framework for evaluating the diverse values inherent in a particular resource (in this case the forest land base). It recognizes that there are numerous criteria that the public wishes to be considered in evaluating land use scenarios. The framework examines impacts for both the TSA and the entire province, as shown in Table 1-1. At the TSA level, the Economic Development, Environment, Community, and Aboriginal accounts are examined. Analysis of provincial-level impacts focuses on economic development and provincial government revenues. The purpose of the analysis is to clearly identify the implications of the alternatives scenarios for each account. It is not meant to recommend a particular option, but only to assist the land use decision process.

The first step is to select illustrative harvest scenarios for the TSA under study. Once the scenarios have been identified, they are assessed according to the multiple accounts. For this project, three scenarios are analyzed. The first scenario does not signify special importance or the status quo. It simply provides the benchmark for comparison of the other scenarios and a yardstick against which to measure impacts.

TABLE 1-1: MULTIPLE ACCOUNTS - GOLDEN TSA	
Account	**Impacts**
TSA Level	
Economic Development	Local income and employment impacts.
Environment	Impacts of the scenarios on the benefits people derive from, or the values they attach to, environmental resources and attributes in the area.
Community	Impacts on population, provision of local services, local government revenues and the provision of local government services and infrastructure. The impacts on community goals such as stability and quality of life.
Aboriginal	Impacts on local native community resources, cultural values, traditional activities and goals.
Provincial Level	
Economic Development	Impacts of different scenarios on economic activity in communities outside the area and in the province as a whole: both direct and indirect.
Environment	Impacts on environmental values and attributes and resource use.
Provincial Government	Government resource-related taxes and other revenues.

The economic impact methodology was developed by the Ministry of Forests and is explained in Appendix 4. Briefly, the approach is as follows:

- Survey forest industry employers to obtain direct forest sector employment.
- Estimate forest industry employment income by using industry average after-tax annual income.
- Use income and employment multipliers to estimate the TSA-level and provincial-level indirect and induced impacts.
- All dollar figures are expressed as 1992 constant dollars.

The approach used for the environmental account is based on ecological principles and is described in Appendix 5. The primary ecological principle is the maintenance of species and ecosystems while providing for social and economic needs.

The approach used to assess community impacts is a qualitative, predictive model. First, the short-term social effects of the harvest scenarios are projected. Second, the

capacity of the physical and social infrastructure to absorb changes is examined. And third, the long-term impacts on the community are analysed.

1.3 DATA SOURCES

The study utilized information and data from a variety of sources. The profile of Golden was prepared using available data from Statistics Canada, BC Statistics, the Columbia-Shuswap Regional District, and the Town of Golden.

The economic impact assessment was based on documents made available by the Ministry of Forests District Office in Golden. The data and assumptions in these reports were updated, verified, and in some cases supplemented by further discussions with the appropriate agencies.

The environmental account was based on an assessment of BC Hydro's Mica Compensation Strategic Plan; comments from Parks Canada, BC Environment, BC Ministry of Forests, and local organizations; and, phone interviews with government officials.

The community account was based on a series of telephone interviews conducted with community leaders and stakeholders. In addition to numerous phone conversations with Evans Forest Products employees, meetings were held in Golden with community representatives in order to discuss the impacts of the harvest scenarios on the company, its employees, and the community at large. Where possible, the impact statements were corroborated with available industry studies and discussions with other industry officials.

Telephone interviews with a representative of the Ktunaxa/Kinbasket Tribal Council and with government representatives were used to gauge the impacts on the aboriginal community.

1.4 REPORT STRUCTURE

The next chapter of this report provides a socio-economic profile of the community of Golden. Chapter Three explains the scenarios to be used in the analysis. Chapters Four, Five, and Six examine the impacts of scenarios 1, 2 and 3, respectively. The final chapter presents a summary of impacts.

2.0 SOCIO-ECONOMIC PROFILE

2.1 OVERVIEW

The Golden Timber Supply Area (TSA) covers 921 231 hectares and is one of seven TSAs comprising the Nelson Forest Region. The TSA is administered by the Golden Forest District office in Golden.

The Golden TSA (see Figure 2-1) lies within the Rocky Mountain Trench, cradled between the Rocky Mountains to the east and the Selkirk and Purcell ranges to the west. It is bordered by five national parks (Kootenay, Yoho, Banff, Jasper, and Glacier) and one provincial park (Hamber). Two smaller provincial parks (Marl Creek and Burgess-Gadsden) lie within TSA boundaries.

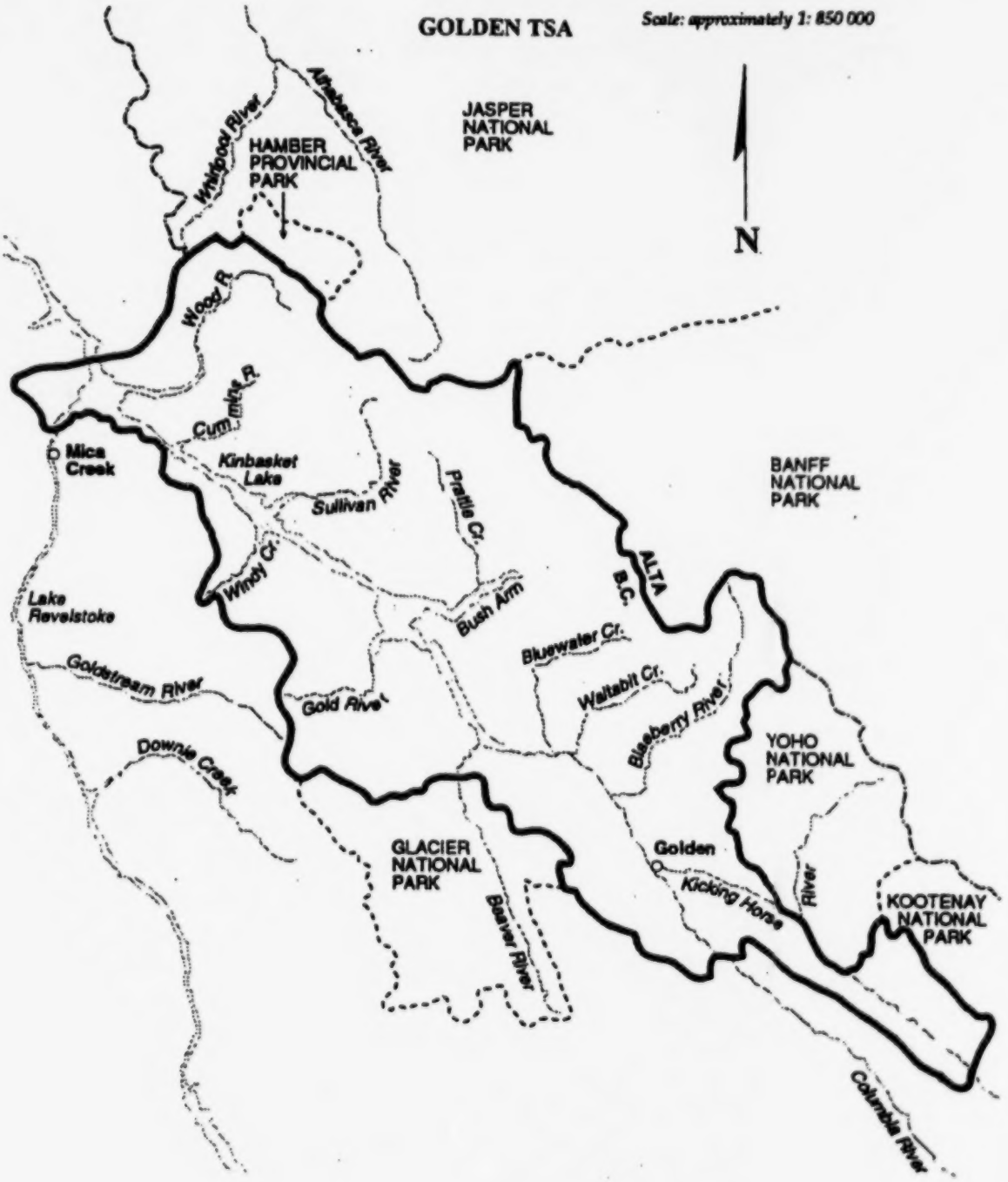
The forested area is characterized by a varied climate and diverse ecology. It is located within the interior wet belt and classified into the moister biogeoclimatic zones: Engelmann Spruce-Subalpine Fir; and Interior Cedar-Hemlock. Montane Spruce and Interior Douglas-fir zones are also represented, but only over a relatively minor range. The region supports a variety of mature commercial tree species, with spruce, lodgepole pine and red cedar predominant. Hemlock, balsam and Douglas-fir are less common but still commercially valuable species.

The Town of Golden is the only sizeable population centre within the Golden TSA. The other community is Donald Station, located 20 kilometres north of Golden on the TransCanada Highway. In 1991, the population of Golden and the surrounding area within the TSA, was 6 845. Since 1981, the population has increased by 6.7 per cent.

2.2 LABOUR FORCE

Labour force data for the last three census years are presented for Golden in Table 2-1. Total labour force growth during the 1980s was 10 per cent. Generally, the sectoral trends tend to reflect national and provincial trends.

FIGURE 2-1


GOLDEN TSA
Scale: approximately 1: 850 000
N
JASPER NATIONAL PARK
HAMBER PROVINCIAL PARK
Whirlpool River
Athabasca River
Wood R.
Cummins R.
Mica Creek
Kinbasket Lake
Sullivan River
Pratt Cr.
Windy Cr.
Lake Revelstoke
Bush Arm
ALTA
B.C.
BANFF NATIONAL PARK
Bluewater Cr.
Goldstream River
Gold River
Downie Creek
Wallabit Cr.
Blaeberry River
YOHO NATIONAL PARK
GLACIER NATIONAL PARK
Golden
Kicking Horse River
Beaver River
KOOTENAY NATIONAL PARK
Columbia River

lower primary and manufacturing employment was offset by increases in other sectors, primarily the service sector. Forestry remains the economic base of the community.

TABLE 2-1: Golden and Area Labour Force by Industry 1981, 1986, 1991

	1981		1986		1991	
	Jobs	% of Total	Jobs	% of Total	Jobs	% of Total
Primary	455	13	505	14	485	13
Manufacturing	805	23	745	20	655	17
Construction	170	5	185	5	240	6
Transportation & Comm.	380	11	345	9	420	11
Trade	375	11	465	13	420	11
Finance, Ins. & Real Est.	90	3	100	3	80	2
Services	945	27	1 055	29	1 225	32
Government	230	7	255	7	265	7
Total	3 450	100	3 655	100	3 790	100

Source: Statistics Canada

Recent work by the Ministry of Finance and Corporate Relations indicated that in 1990 56 per cent of the basic sector income[1] in Golden was derived from forestry activity. In comparison, eight per cent was derived from tourism [Planning and Statistics Division, Ministry of Finance and Coporate Relations, 1993]. The Ministry also determined that, of the 55 BC areas studied, only two other areas were more dependent on forestry than Golden.

2.3 FOREST INDUSTRY

AAC Apportionment

The currently approved AAC for the Golden TSA is 650 000 m^3, set by the Chief Forester in January 1981. Evans Forest Products Limited is the major licensee (its Forest Licence volume is 473 623 m^3), and processes its harvest in two area mills, a

[1] Basic income flows into the community from outside: in the case of employment income it is earned in the production of goods and services which are exported from the community or in the indirect support of such activity [Planning and Statistics Division, Ministry of Finance and Corporate Relations, 1993].

sawmill in Donald and a plywood mill in Golden. The two mills have a combined annual processing capacity of 830 000 m^3. Wood River Forest Inc. has the other Forest Licence (61 533 m^3), which is processed in Revelstoke. There are four small (i.e. less than three million board feet annually) mills in the TSA. In addition, there are 22 logging contractors and companies registered in the region.

Evans Forest Products Limited

Evans Forest Products Limited dominates production and is responsible for employing most of the forest workforce in the TSA. Table 2-2 provides operating statistics for the two mills.

TABLE 2-2: Evans Milling Operations, Golden TSA, 1989-1992

	Annual Capacity	1992	1991	1990	1989	1988
Plywood						
Input Volume m^3	305 000	274 588	266 384	308 618	329 041	313 642
Jobs (PY[1])		217	223	247	264	255
Sawmill						
Input Volume m^3	525 000	426 921	277 886	289 761	458 405	435 646
Jobs (PY)		175	147	152	209	205
Total Inputs	830 000	701 509	544 270	598 379	787 446	749 288
Total Jobs (PY)		392	370	399	473	460

Source: Evans Forest Products Limited

[1] A person-year (PY) is a standard measure of employment used to facilitate comparison and aggregation of part-time, seasonal and overtime employment. A PY is defined here as 1 800 hours of work in a year.

In 1992, the plywood mill operated at 90 per cent capacity, and the sawmill 81 per cent. Between 1989 and 1991, mill upgrades and strikes curtailed production in both mills. In the first six months of 1993, the plywood mill was operating at 100 per cent capacity, and the sawmill at 90 per cent. Recent mill upgrades have given Evans relatively competitive manufacturing facilities.

Employment at the two mills was 217 and 175 PYs, respectively, in 1992. Employment at both plants has decreased modestly but consistently over the last five years as processing efficiencies (the result of mill upgrades) have taken effect.

In 1992, Evans employed 85 PYs in woodlands and administration positions; and supported a further 285 PYs in contract employment relating to quota and purchase volumes. Total direct employment attributable to Evans of 762 PYs represented about 20 per cent of the Golden labour force. (Of these 762 PYs, approximately 360 were related specifically to the harvesting of Evans' Forest Licence.)

In 1992, Evans purchased $3.5 million in supplies from more than 80 businesses in Golden. Of these, approximately five equipment supply and maintenance firms are heavily reliant on Evans' purchases. The indirect employment generated by Evans, the more than 20 per cent of the work force directly employed by the company, and the estimated 50 per cent of total community employment income attributed to forest sector activity, demonstrate the extent to which Golden relies on Evans to support its economic base. (These figures include the economic activity associated with timber obtained from sources other than Evans' Forest Licence, further discussed below.)

Improved lumber and plywood prices and increased production at the sawmill have boosted Evans' revenues in the last year and a half. Sales of $56.4 million in 1991 increased 34 per cent to $75.7 million in 1992. Further increases in revenue due to volume and price increases are projected for 1993. The immediate future demand for Evans' products appears strong. The future demand for BC lumber is expected to strengthen, continuing a trend originating in late 1991 when the United States housing market and shipments to Japan stimulated BC production. Although lumber prices fell during the summer of 1993, average prices in 1992 and early 1993 have been the highest since 1987 and helped bring positive cash flows back to the industry [Price Waterhouse 1992]. Plywood demand is also strong. Canadian and U.S. demand and production are both projected to increase moderately through to 1996, on the strength of improved residential and industrial markets [American Plywood Association 1993]. However, factors such as exchange rates, duties, and supply constraints in competing regions such as the U.S. Pacific Northwest will probably continue to drive the markets for BC forest products.

Table 2-3 shows the Evans mills' wood sources. The plywood mill obtained 87 per cent of its 1992 supply from the Golden TSA and the remainder from non-TSA sources, primarily in Revelstoke. The sawmill obtained 74 per cent from within the TSA, and 26 per cent from outside. However, Golden TSA sources include not only Evans' Forest Licence, but also significant volumes from Evans' Timber Licences, the Small Business Forest Enterprise Program (SBFEP), and from private lands. In 1992,

Evans' Forest Licence supplied 54 per cent of its milled wood, while 46 per cent came from other sources inside and outside the TSA.

To supplement its Forest Licence volumes within the TSA, Evans has historically (with the exception of 1993) purchased the bulk of the TSA's available SBFEP supply. Approximately 54 000 m^3 of the TSA's SBFEP apportionment is currently available to Evans through purchase or trade. However, bidding for this wood from other buyers is becoming increasingly competitive. Within the Golden Forest District, Evans also harvests approximately 50 000 m^3 from its Timber Licences (these licences are not currently included in the land base supporting the AAC, but will be included after they expire, chiefly in the next decade after most of their merchantable timber has been harvested).

TABLE 2-3: Evans Supply Source by Mill, 1989-1992
Percent

	1992	1991	1990	1989
Plywood				
Golden TSA[1]	87%	91%	94%	86%
Non-Golden TSA	13%	9%	6%	14%
Sawmill				
Golden TSA	74%	80%	59%	70%
Non-Golden TSA	26%	20%	41%	30%
Total				
Golden TSA	78%	84%	75%	76%
Non-Golden TSA	22%	16%	25%	24%

[1] Golden TSA includes Evans Timber Licences, purchase wood from SBFEP and private sources.
Source: Evans Forest Products Limited

As Table 2-3 indicates, non-Golden TSA sources have made up a significant proportion of Evans' mills wood supply. Access to other sources of supply is limited, either by diminishing harvests or by increased competition from other operators (mostly from outside the Golden Forest District). One of these is the private Beaumont property in the Revelstoke TSA, from which it purchased approximately 60 000 m^3 in 1992. However, Beaumont wood is expected to no longer be available within three years, forcing more competitive bidding for the sources that remain.

Because non-Forest Licence volumes make up a significant portion of the mills' input, reductions in available Timber Licence and purchased volumes from private land, both inside and outside the TSA, have implications for the viability of Evans' plants independent of the impacts associated with the timber supply scenarios examined in this report.

Evans' ability to compete for wood outside its existing tenures is limited to some extent by its log costs, which are the highest in the B.C. interior due to the mountainous nature of the TSA. These costs are expected to increase in the future as more steep slope logging occurs (see below).

Evans recently purchased TFL #55 (Revelstoke Forest District) and the Malakwa cedar mill from Westar Timber, on condition that the mill be kept operating. In addition, 100 000 m^3, or one half of the cut, was removed from the TFL and awarded to the Revelstoke Community Forest Corporation as a new TFL. The net result was that, while the purchase did not actually increase the available supply to Evans' operations in the Golden TSA, the flexibility to exchange logs to the benefit of the Golden mills was slightly enhanced.

Timber Harvesting Trends

Location and Season - Recent timber supply analysis indicates that, in the next few decades, the majority (about 70 per cent) of the timber harvest will have to come from the four supply blocks in the northern portion of the TSA. Harvesting is more costly in the north than in the south, mainly because of limited road access, longer hauling distances, and higher levels of snowfall.[2] These factors have constrained winter logging operations in the north. In contrast, the south, with good access and low snowfall, has been extensively logged in winter. The concentration of harvesting in the south has decreased the availability of low-cost winter logging operations. Recent harvest planning has endeavoured to increase the amount of harvesting in the north, thus increasing the amount of summer logging and decreasing the amount done in winter (due to poor winter access in the north). This has resulted in fewer harvesting employees working in winter than in the past.

[2] Main haul roads into the northern part of the TSA have been extended in recent years, but are used mainly for non-winter operations. However, the road/ferry system built near the Wood Peninsula has facilitated additional winter logging in that area.

Logging Method - A greater proportion of steep-slope logging is likely to occur in the future.[3] The Golden TSA AAC was set in 1981 recognizing that the proportion of steep-slope logging would have to increase. Although there has been an increase in the proportion of steep-slope logging since then, initial estimates by Golden Forest District staff indicate that the current level may be insufficient to match the timber supply profile over the next two decades. It is likely that harvesting on these areas will continue to increase in the future. This could increase the demand for harvesting employees (per cubic metre of wood harvested), because steep-slope logging is relatively more labour-intensive than logging on flatter terrain.

2.4 TOURISM

Tourism is the second major industry in Golden and the fastest growing, adding jobs to the workforce at a rate faster than they are being lost in the forest and transportation sectors. The growth potential for tourism in Golden is excellent.

Attributes

Among Golden's strongest tourism attributes are the following:

- Towering mountain ranges, converging valleys, and the dominating presence of the Rocky Mountain Trench make the region a geomorphic point of interest.
- The geomorphology of Golden is an attribute highly valued by the tourism industry. Recently developed tourism products such as river rafting, hang-gliding, heli-skiing and downhill skiing are directly dependent on the montane nature of the area. Examples of valuable tourism sites include: the Kicking Horse River, one of only seven in the province to be licensed for rafting; and Mount 7, world renowned as a hang-gliding and para-gliding site, host to national and international gliding championships, and site of various world records in the sport.
- Golden's location within a major migratory flyway, the Columbia wetlands, and its diversity of climatic and forest zones collectively attract an expanding wilderness adventure market.
- Close proximity to five National Parks (Banff, Jasper, Kootenay, Yoho, and Glacier).

[3] Slopes over 50 per cent in grade are considered steep. Cable and modified ground-skidding systems are required to mitigate degradation on steep slopes, but these methods are more costly than conventional ground skidding.

Industry

There are between 85 and 100 businesses in the Golden area catering to tourism markets. These include accommodation, food and beverage facilities, adventure wilderness and guiding operations, and retail, service and transportation businesses serving both local and tourism markets. Traditionally, the industry has been dominated by accommodation, food and beverage facilities catering to the highway touring markets. In the last 10 years, however, most of the growth in the industry has come from businesses catering to the wilderness adventure sector. There were approximately three operations in the early 1980s, but there are now a total of 25 operators in the following segments: rafting; backcountry lodges; heli-skiing/heli-hiking; fishing lodges; and horseback/outfitters.

The industry in Golden was estimated to have generated $32 million in direct tourism purchases in 1991 [Golden Team Action Committee, 1992].

Tourism employment in Golden is difficult to estimate, first, because of the fragmentation of the available statistical data across various sectors, and second, because of the preponderance of small businesses dealing in tourism and the difficulty this creates in assembling original, regional data. We have referred to the Ministry of Forests, Golden District Office methodology utilized in its 1992 socio-economic analysis of the Golden TSA [Golden Forest District, MoF, 1992] to assist in estimating employment. The study used original survey data to adjust Statistics Canada 1986 accommodation, food and beverage employment of 515 to a full time equivalent, basic sector employment of 331. We have applied the same adjustments to the 1991 Statistics Canada employment data (640) for the same sector and arrived at a full time, basic sector equivalent of 411 jobs in 1991. Assuming that the 151 wilderness adventure positions estimated in the same study are correct, tourism employment was in the neighbourhood of 562 in Golden in 1991.

Parks personnel represent additional tourism employment in the region. Even though the Canada Parks Service has mandates other than tourism, a majority of positions are directly attributable to tourism activities. Current full time equivalent employment of Golden residents in Yoho National Park is 47 and in Glacier National Park five. Including parks personnel, total tourism employment in Golden and area is 614[4].

[4] Neither Yoho nor Glacier National Park is within the TSA, so these jobs are not included in the economic impact analysis. It focuses on jobs attributable to the TSA's forest resource.

Markets

Golden is in the Rocky Mountain Tourism region. Based on visitor data compiled for this region, the Golden tourism industry caters to markets with the following profile characteristics:

- Almost half of visitors drawn to the Golden area are from Alberta, a quarter are from the U.S., and seven per cent are from overseas.
- Visitors spend less in the region ($35.75 per day) than the BC average ($54.90 per day), with Canadians and Europeans spending significantly more than Americans.
- Markets are highly seasonal, with 47 per cent of business in the summer months.
- One third of visitors are among the touring market. These tend to be Americans travelling by car and RV to Alaska. Outdoor recreation activities are an attribute valued by this market.
- Fourteen per cent of visitors come to the region for destination outdoors activities, one of the highest proportions in the province. Expenditures and length of stay are much higher for this market than for the average visitor [Industry, Science and Technology, 1990].

This profile applies to the entire Rocky Mountain Tourism Region, and includes, but is not limited to, Golden visitors.

Parks

Golden is at the crossroads of five national parks and three provincial parks, and these are becoming increasingly popular with domestic and international travellers. Alberta Tourism has identified Golden as one of the leading gateways to the regional national park system. Survey results clearly demonstrate that the scenery and mountain experience are the motivating factors in nearly all visitor activities. They are seen as the parks' greatest strengths. Conservation and protection is also a visitor concern for the parks, and partly for this reason, development is being channelled into the gateway communities. At the same time, planned growth that successfully manages environmental integrity is imperative in communities like Golden if they are to benefit from parks tourism. With visitation growing at four to five per cent per annum, and with carrying capacities limiting many types of developments and activities within the parks, Golden has the potential to piggyback on this success, but only to the extent it can offer the environments sought by visitors [Alberta Tourism, 1991].

Industry Trends

Industry trends that will affect Golden tourism in the future include:

- International travel and destination travel within the region is on the increase.
- Touring travel, one of the mainstays of local tourism, is a declining market segment. However, wilderness adventure travel and eco-tourism are growing in importance.
- International market trends point to an increasing interest among outdoor adventure consumers for learning-based experiences that depend upon wildlife and wilderness attributes for interpretation and instruction.
- The growing potential for resource user conflicts was cited in a recent report as being one of the major threats to tourism in the region [Ministry of Regional and Economic Development, 1990]. "It is therefore important to develop an integrated approach to resource planning and management which recognizes the values of the tourism resource and minimizes the potential for conflict with other users. Care must be taken to ensure that . . . resource developments do not adversely affect the scenic landscape, the water quality of the lakes and rivers or inhibit public access to these natural resources".

2.5 TRANSPORTATION

In the early 1980s, CP Rail had fewer than 40 positions in Golden. With the opening of the car repair shop, employment grew to 150 positions by 1990 before dropping to approximately 100 due to nation-wide downsizings by CP Rail.

Rail industry employment faces an uncertain future due to the possibility of future downsizing and rationalization and the questionable viability of the southeast coal mines on which many jobs depend.

2.6 OTHER ECONOMIC SECTORS

Agriculture - Golden is not a major agricultural area. Approximately 68 farms cover 16 000 acres, less than one third of which is improved. Cattle and poultry are the major products, and more than 90 per cent of the farms generate revenues of less than $25 000 annually. In 1991, Statistics Canada estimated total agriculture and related

service employment in Golden at 45. There is little future potential for the diversification or expansion of the agricultural sector in Golden.

Mining - Current mining employment in the Golden area is 50. Historically, the mining industry has been a small employer of the local workforce. With one silica pit, and some limited deposits of silica, barite and magnetite, all of the region's mining potential is in the industrial mineral category, where employment levels are typically low.

Construction - The construction industry in Golden grew significantly between 1986 and 1991 on the strength of both industrial and institutional building projects. Markets for residential, institutional, and industrial construction are expected to remain strong in the near term, helping to maintain employment. There are no imminent major building projects for the region; however, a commencement of all or part of the Yoho to Donald Trans Canada Highway upgrade would be a major boost to the local industry (total construction costs are estimated to be in the $500 million range).

Retail - Retail trade employment in Golden actually declined between 1986 and 1991 as retailers contended with an extended recession, poor local conditions, and a restricted trade area. The future development of this sector will be tied to population and tourism growth.

Services - The service sector (excluding tourism) has been, together with tourism, the bright light of the Golden economy over the last five years, outstripping even provincial growth. Moreover, the growth has occurred in the personal and business services categories, and not the public service areas (i.e. education and health). In the last five years an increasing number of professionals and business service firms have located in the area, helping to diversify the small business base. Advances in computer and telecommunication technology and the close proximity to Calgary have allowed many entrepreneurs to enjoy the benefits of a rural lifestyle without sacrificing their competitiveness. The lower cost of living and the high quality life style (in terms of environmental and recreational benefits) continue to stimulate the migration of service businesses into the community.

2.7 ABORIGINAL ISSUES

The Golden TSA lies within the traditional lands of the Shuswap Nation. The Ktunaxa/Kinbasket Tribal Council, of which the Shuswap Band is a member, has submitted a comprehensive land claim covering the entire southeast corner of the province. The land claim encloses the Golden TSA and corresponds approximately with the boundaries of the Nelson Forest Region, excepting the Boundary TSA.

The land claim submission was accepted by the federal government under the comprehensive claims policy adopted in 1976. Last year a new Treaty Commission was established to facilitate land claims negotiations in BC. The Ktunaxa/Kinbasket Tribal Council has filed a letter of intent to negotiate its land claim under the new policy. There is no firm timetable for either negotiations or settlement.

There are no reservations, no aboriginal communities, and no identifiable aboriginal populations within the Golden TSA. There is no subsistence activity in the TSA, either in the form of fishing or trapping. There is no aboriginal employment within the forest workforce in Golden.

The nearest Indian Band is the Shuswap Band, located to the south in Invermere. The band's links to the area are historical in nature, since there is no direct economic activity, employment or otherwise, being generated. Historically, the Shuswap hunted, fished, trapped and subsisted in the region. There are at least 30 documented archaeological sites in the area, primarily house pits along the Columbia. In addition, there are an unknown number of heritage and spiritual sites for which documentation and evidence is now being assembled to assist the land claims process.

Our conversations with aboriginal representatives yielded concerns about Ministry of Forests policy in general rather than activity within the Golden TSA specifically. The two most notable concerns were the lack of heritage considerations in harvest planning and a perception that the Ministry was reluctant to adopt integrated resource management practices.

2.8 ENVIRONMENTAL SETTING

Description[5]

The most northerly portion of the TSA, the Big Bend Trench, consists of steep, forested valleys that drop directly into Kinbasket Lake. The majority of the valley bottom land in the area has been flooded by the Mica Dam. It is the wettest area of the Rocky Mountain Trench and supports cedar-hemlock forests. There are no permanent human settlements in the area.

The portion of the TSA north of Donald encompasses the Central Continental Ranges. Rugged peaks and steep valleys make this the most formidable area of the TSA. In the east, the alpine is dominated by glaciers and bare rock, although some vegetation exists. Englemann Spruce-Subalpine Fir (ESSF) forests are supported on the steeper valleys, with cedar-hemlock supported in the lower valleys, and wetlands in the valley bottoms. Ungulate (mostly moose) distribution is confined by deep snowfalls to the southern area. Mountain goats inhabit south-facing cliffs.

The portion of the TSA south of Donald and east of the Columbia River is known as the Southern Continental Ranges. It too is characterized by rugged and steep peaks. Spruce-fir forests cover the valley slopes, while white spruce and Douglas fir occur in valley bottoms. Lodgepole pine is common throughout. This area is the driest in the TSA, and receives the least snow because it lies within the rain shadow of the ranges to the west. Mule deer, elk, bighorn sheep, and moose are found in lower elevations and wider valleys.

The Eastern Purcell Mountains area, which forms the southwest portion of the TSA, is composed of rugged, mountainous topography except in the Spillimacheen Valley and in the Rocky Mountain Trench itself, where larger valley bottom tracts exist. ESSF forests occur on the steep slopes. This is also a rain shadow area, although higher peaks receive more precipitation than the lower areas. Deep winter snows tend to limit ungulate distribution, although there are important mountain goat and moose habitats in the area.

[5] The contents for this section are largely based upon Mica Wildlife Compensation Program Strategic Plan, BC Hydro et al., August, 1992.

Biodiversity

Table 2-4 lists the major biophysical habitats within the Golden TSA. The data is divided between the Big Bend region and the Columbia Valley. These study areas do not coincide exactly with the boundaries of the TSA - they also incorporate the entire land base, including parks (Kootenay and Yoho National Parks, and Hamber Provincial Park).

TABLE 2-4: Percentage Share of Habitat & Percentage Preserved Within Parks

	Big Bend		Columbia Valley	
	% Share of Habitat	% Preserved in Parks	% Share of Habitat	% Preserved in Parks
Englemann Spruce-Subalpine Fir	26.9	3.3	35.3	9.8
Alpine Tundra, Glaciers, Bear Rock	33.8	4.2	24.0	7.5
Interior Cedar Hemlock	21.8	1.2	3.9	0.0
Avalanche Paths	9.0	1.3	6.2	1.5
Subalpine Parkland	4.4	0.6	1.2	0.3
Urban, Subalpine Meadows and other	3.5	0.2	2.9	0.3
White Spruce-Subalpine Fir	0.0	0.0	9.2	2.0
South-facing White Spruce-Subalpine Fir	0.0	0.0	3.2	0.2
Riparian	0.3	0.1	1.0	0.1
Open Wetlands	0.3	0.1	2.1	0.1
Cultivated Fields and Grasslands	0.1	0.0	0.7	0.0
Douglas Fir	0.0	0.0	9.0	0.0
South-facing Douglas Fir	0.0	0.0	1.1	0.0

[1] Kootenay and Yoho National Parks and Hamber Provincial Park.

Source: BC Hydro et al., Mica Wildlife Compensation Program Strategic Plan, August 1992.

The following points are worth noting:

- The high elevation habitats are generally abundant and unthreatened.
- Spruce-fir forests are being reduced through timber harvesting, but inaccessible, inoperable and park areas support a significant portion.

- Most low elevation habitats are threatened by human activity, with wetlands and riparian valley bottom forests occurring rarely.
- Douglas fir, wetlands, and riparian forests comprise only a minute portion of the land base. The long-term supply of these habitats is limited and declining.
- Old growth components have been logged most heavily in the valley bottom areas of the TSA. The majority of Cedar-Hemlock old growth forests will have been logged in the next 30 to 40 years.

Wildlife inventories are incomplete, but the available information suggests that approximately 274 species of birds, 63 of mammals, nine of amphibians, and eight of reptiles inhabit the area. The most endangered habitats (grassland, riparian forest, wetlands) support 160 (45 per cent) species. Old conifer forests support 28 species. Rare and declining low elevation habitats support 53 per cent of all species [BC Hydro 1992].

The BC Conservation Data Centre has classified a number of provincially threatened species in the Golden TSA. These are shown in Table 2-5.

Table 2-5: Threatened Wildlife Species in the Golden TSA

S1[1] and S2[2] Rank	S3[3] Rank	
Northern Long-Eared Myotis	Black-Chinned Hummingbird	Western Screech-Owl
Woodland Caribou	Great Blue Heron	Rocky Mountain Bighorn Sheep
Short-Eared Owl	American Bittern	Grizzly Bear
Prairie Falcon	Tundra Swan	Wolverine
Northern Leopard Frog	Bobolink	Fisher
American Peregrine Falcon	Bald Eagle	
	Lewis' Woodpecker	

[1] Critically imperiled on a provincial scale because of extreme rarity.
[2] Imperiled because of rarity.
[3] Rare or uncommon; may be susceptible to large-scale disturbances.

Source: British Columbia Conservation Data Centre. Ministry of Environment. July 29, 1993.

Protected Areas

Some sites within the Golden TSA are protected by either provincial or federal government agencies. These include the Goosegrass Ecological Reserve, Burges and James Gadsden Provincial Park, and Marl Creek Provincial Park.

Regarding the Protected Areas Strategy, the Regional Protected Areas Team is currently assessing areas of interest and Cabinet-approved Study Areas, and will be sending a revised list of Study Area options to the Inter-Agency Management Committee (IAMC) for their consideration. IAMC will recommend study area options for Cabinet approval. Technical information used for the Protected Areas Strategy (PAS) will be made available to the Commission on Resources and Environment (CORE), which will use the information in the development of land use recommendations.

Recreation

Local recreation activities include boating, camping, hunting, fishing, hiking, mountain biking, kayaking, hang-gliding and para-gliding, bird watching and wildlife viewing. In the winter, snowmobiling and cross-country skiing are popular pursuits.

Usage of forest recreation sites has increased by 50 per cent over the last five years, as residents have taken advantage of improved access provided by logging roads, particularly to sites close to the town of Golden.

Major recreational areas for residents include Gorman Lake (hiking, biking, snowmobiling), Blackwater Lakes Area (boating and water-based recreation), Columbia Wetlands (bird watching), Quartz Creek (snowmobiling), and Blaeberry Valley (multi-use).

Sites supporting both residential and non-residential (i.e. tourism) activities include Beaverfoot (hunting, hiking, camping), Sir Sanford/Adamant (mountaineering, heli-skiing, heli-touring), Clemenceau (mountaineering), Mummery Glacier (hiking), Kicking Horse (river rafting and kayaking), Mount 7 (para-gliding and hang-gliding), and the Athabasca Pass and Howse Pass Trails (hiking).

3. TIMBER SUPPLY SITUATION

3.1 INTRODUCTION

The MoF's Integrated Resources (now called Resource Planning) Branch in Victoria, in conjunction with Golden Forest District staff, released a Timber Supply Analysis report in June 1993. The report discussed a range of future harvest forecast scenarios. The same forest management practises and operable land base were utilized for each harvest level scenario; only the amount and timing of the potential timber harvest were varied. Sensitivity analyses examined the implications for timber supply of changes in volume per hectare, net operable hectares and forest cover constraints.

To illustrate a broad range of socio-economics impacts this report examines three harvest scenarios (all of which assume current forest management practises).

3.2 CURRENT FOREST MANAGEMENT GUIDELINES[6]

The majority of the Golden TSA is currently managed as "Timber Resource Emphasis", which enables a three pass harvesting system with a minimum 15 to 20 year green-up period (two to three metre tall regenerated trees) between passes. The remainder is managed to either "Recreational or Wildlife Emphasis".

The selection of a forest management system sets constraints on the amount, location and timing of the annual timber harvest. Present harvest levels cannot be maintained if a significant portion of the operable land base is subject to current IRM practises and if there is to be no severe future falldown in timber supply. The Timber Supply Analysis showed that even if the entire TSA were to be managed for "Timber Emphasis" the harvest would have to decrease in the near future to avert a severe future falldown in timber supply. The Timber Supply Analysis used the prevailing forest management practises for all scenarios. For the sensitivity analysis, some of the forest management practises were altered (such as the elimination of forest cover guidelines) to examine their influence on the harvest profile[7]. In this socio-economic assessment, only the impacts of the scenarios under prevailing forest management practises are examined.

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[6] See Appendix 9, Golden TSA Forest Harvesting Guidelines.

[7] Readers interested in this sensitivity analysis are directed to obtain the June 1993 Golden Timber Supply Analysis through MoF's Golden Forest District Office or MoF's Victoria based Resource Planning Branch.

3.3 CURRENT ALLOWABLE ANNUAL CUT

The operable timber harvesting land base in the Golden TSA is 174 599 hectares, 19 per cent of the TSA's total land base and 58 per cent of its productive forest area.

Allowable Annual Cut

The current AAC for the Golden TSA is 650 000 m^3, set by the Chief Forester in January 1981. The harvest apportionment is shown in Table 3-1. Immediately prior to 1981, the AAC was 682 680 m^3.

TABLE 3-1: Current AAC Apportionment, Golden TSA, 1993

	m^3	% of AAC
Forest Licences	535 156	82.3%
Small Business Forest Enterprise Program	98 206	15.1%
Woodlot Licences	6 500	1.0%
Forest Service Reserve	10 138	1.6%
Total Approved AAC	650 000	100%

Licensees

The primary licence holders in the TSA appear in Table 3-2. Evans is the major licensee and processes its harvest at its sawmill in Donald and its plywood mill in Golden. Wood River Forest Inc. processes its cut in Revelstoke.

TABLE 3-2: Current Forest Licences , Golden TSA, 1992

Licensee	m^3	% of AAC
Evans Forest Products Limited	473 623	72.9%
Wood River Forest Inc.	61 533	9.5%
Total	535 156	82.3%

Wood Flows

Evans' consumption of Golden TSA wood has fluctuated in the recent past due primarily to strikes and upgrade shutdowns. In general, however, the company processes all its Golden TSA wood at its two local mills and further has historically (with the exception of 1993) purchased and processed the majority of Small Business wood (98 206 m^3) in the TSA (a significant portion of the SBFEP wood is not available for purchase by Evans). With the exception of a portion of the SBFEP wood, the only significant source of wood believed to leave the TSA for processing is Wood River Inc.'s apportionment of 61 533 m^3, which goes to Revelstoke.

3.4 DESCRIPTION OF SCENARIOS

The three scenarios are shown in Table 3-3. The harvest levels apply to the beginning of each decade. The MoF's Integrated Resources (now called Resource Planning) Branch [1993] has determined that harvest levels in the next several decades could be significantly above the long-term harvest level of 309 000 m^3 because of the TSA's large area of old growth forest, with its higher volume yields.

The timber supply analysis showed that, if the current harvest level were maintained for four decades, there would be a steep decline below long-term harvest levels to 107 000 m^3 by the sixth decade, before increasing slowly to reach the long-term harvest level by decade ten.

Development Plans and Annual Reports received by the MoF from timber operators in the Golden TSA indicate that the merchantable volumes used in the timber supply scenarios for mature stands to be harvested are optimistic. If this is the case, there could be greater impacts on timber supply over the next 10 to 40 years than is shown in the harvest scenarios.[8]

[8] Personal communication. Golden Forest District office. 1993.

TABLE 3-3: Harvest Scenarios

Harvest Period	Scenario 1		Scenario 2		Scenario 3	
	Harvest '000m³	% Change	Harvest '000m³	% Change	Harvest '000m³	% Change
Current	650	-	650	-	650	-
Year 0	605	(6.9)	650	0.0	484	(25.5)
Year 10	543	(10.2)	559	(14)	484	0.0
Year 20	486	(10.5)	490	(12.3)	484	0.0
Year 30	436	(10.3)	428	(12.7)	484	0.0
Year 40	390	(10.5)	374	(12.6)	431	(10.9)
Year 50	349	(10.5)	326	(12.8)	388	(10.0)
Year 60	313	(10.3)	309	(5.2)	348	(10.3)
Year 70	309	(1.3)	309	0.0	311	(10.6)
Year 80	309	0.0	309	0.0	309	(0.6)

Scenario 1

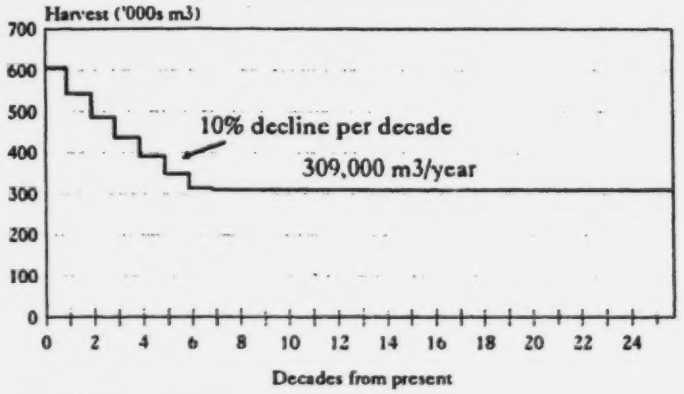
Scenario 1 (Figure 3-1) corresponds to the "Base Case" in the Timber Supply Analysis report. In this report it is used only as the benchmark for comparison with the other two scenarios, and is not a recommended or leading alternative. Scenario 1 begins with a maximum allowable harvest of 605 000 m³, a seven per cent decrease from today's AAC volume. Thereafter, the harvest declines by 10 per cent for each of the first seven decades to the long-term harvest level of 309 000 m³, a 52 per cent reduction below present levels.

Scenario 2 - Current Harvest Level for One Decade

Scenario 2 (Figure 3-2) starts at the present harvest level of 650 000 m³, and drops by 14 per cent in the second decade to 559 000 m³. Compared to Scenario 1, where harvest levels decline at approximately 10 per cent per decade between the first and sixth decades, Scenario 2, because it assumes a higher initial harvest, declines by 12 per cent per decade. The long-term harvest level is reached in the seventh decade compared to the eighth and ninth decades in the first and third scenarios, respectively.

Figure 3-1

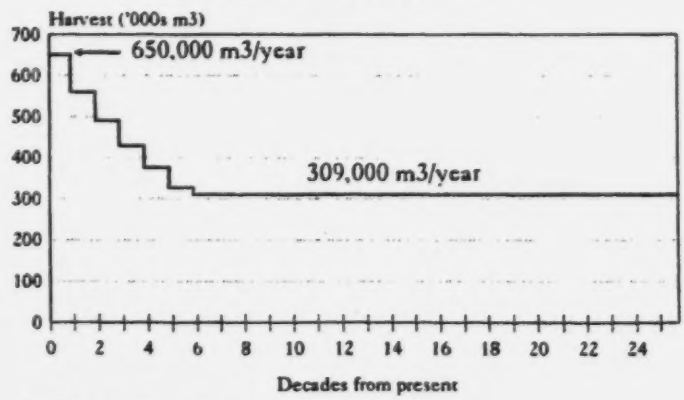
Scenario 1 Harvest Forecast



Source: Ministry of Forests

Figure 3-2

Scenario 2 Harvest Forecast



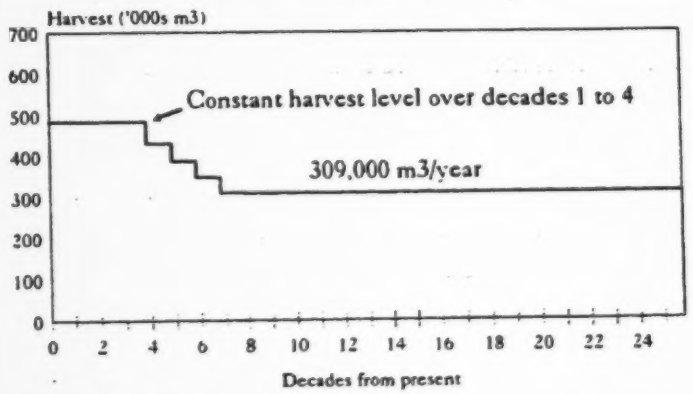
Source: Ministry of Forests

Scenario 3 - 40 Year Constant Harvest

Under Scenario 3 the harvest level is dropped immediately by 26 per cent, to 484 000 m^3, held constant for forty years, then reduced by 10 per cent per decade until the long-run harvest is reached in year 80. Figure 3-3 shows the third scenario.

Figure 3-3

Scenario 3 Harvest Forecast



Source: Ministry of Forests

4.0 SCENARIO 1 IMPACT ASSESSMENT

This section describes the economic, environmental, community and aboriginal impacts on the region and the province resulting from the harvest reductions identified in Scenario 1.

4.1 TIMBER SUPPLY AREA IMPACTS

Economic Development

Forestry employment and employment income impacts of Scenario 1 harvest levels are shown in Table 4-1.[9]

The employment co-efficient presumes a linear relationship between harvest level and jobs, so employment changes parallel changes in the harvest levels. While the linear relationship provides an estimate, in reality, employment changes would probably occur irregularly and depend also on additional factors such as:

- government budgeting, which could affect silviculture activity and Golden Forest District office employment;
- increased mechanization, which could lead to further job loss; and,
- increased steep slope logging, which could lead to increased woods employment.

Workers who lose jobs may find alternative employment locally or elsewhere. There may be a possibility of employment in the value-added manufacturing part of the forest industry. The estimated job impacts should be interpreted as a short-term or first round effect; in the longer term, many unemployed are likely to find work elsewhere.

In Scenario 1, direct forest sector employment in the TSA would fall off immediately by seven per cent, or 43 PYs, below present employment levels. There would be a further 34 PYs of associated indirect jobs lost, leading to a total decline of 77 jobs in the first decade. The corresponding direct income and indirect employment income losses would be $1.3 million and $.7 million, respectively. By year 10, a further 106 total jobs and $2.8 million in total employment income is lost. By year 70, when the long-run harvest level is reached, there would be a cumulative loss of 580 direct and

[9] The current forest industry employment situation is addressed in Section 2.3. The employment co-efficients and income multipliers are discussed in Appendix 4.

indirect jobs[10].

Table 4-1: Scenario 1 - TSA Economic Impacts

	Harvest	Employment (PYs/Year)			Employment Income ($1992 Millions/Year)		
Year	'000 m^3	Direct[1]	Indirect[2]	Total	Direct[3]	Indirect[4]	Total
Current	650	618	488	1 106	$18.7	$10.3	$29.0
0	605	575	454	1 029	17.4	9.6	27.0
10	543	516	407	923	15.6	8.6	24.2
20	486	462	365	827	14.0	7.7	21.7
30	436	414	327	741	12.5	6.9	19.4
40	390	371	293	664	11.2	6.2	17.4
50	349	332	262	594	10.0	5.5	15.5
60	313	297	235	532	9.0	5.0	14.0
70	309	294	232	526	8.9	4.9	13.8
80	309	294	232	526	8.9	4.9	13.8

1 The estimated employment coefficient for the Golden TSA is .95 PY per 1 000 m3. See Appendix 4.

2 Indirect employment for the region was obtained by dividing indirect employment income by an average annual after-tax income for Golden of $21 080 in 1992. See Appendix 4.

3 The average 1992 annual after-tax income for a BC forest industry employee was $30 269. See Appendix 4.

4 Indirect employment income for the region was derived using a multiplier of 1.55 developed specifically for Golden. See Appendix 4.

The impacts on non-tourism recreation would be minimal[11]. The most popular sites for water-based recreation, like the Blackwater Lakes, have already been fully impacted by logging activity and continue to see increased use. Future logging would have little effect on these lakes. Wildlife viewing and hunting could benefit from increased incursion of logging roads and access throughout the TSA in the short-term, if road closures are not imposed. In the long-term, however, declines in wildlife populations may negatively affect these activities. The major snowmobiling, cross-country skiing, kayaking and hang/para-gliding sites already benefit from suitable access, and are unlikely to be impacted by continued harvesting.

The impacts on the tourism industry in Golden are more difficult to gauge.[12] Many tourism markets (and most recreation markets) are feature driven - they rely on natural

10 An analysis of the threshold levels for the Evans' mills appears in Appendix 7.

11 Recreation refers to a range of outdoor activities undertaken either by a resident of the area, or a non-resident. Non-resident visitors are commonly referred to as tourists. The impacts referred to in this paragraph refer only to resident recreationists.

12 A tourist is a visitor who travels to a place outside his/her usual environment for at least one night.

features and not the built environment. Golden's destination tourism and recreation markets fall within this category, and it is therefore important to recognize the need to preserve the natural "qualities" that continue to attract key markets. Unfortunately, what these "qualities" are, and how they are defined and quantified, is not well understood.

Regional tourism features could be negatively affected by continued harvesting activity, but the past relationship between harvesting and tourism in the TSA does not shed any light on how. The tourism sector continues to grow in Golden despite extensive harvesting. Nevertheless, tourism industry representatives have expressed concerns about the potential negative impacts of harvesting. For example, back country lodges contend that unsightly clearcuts and excessive vehicle noise from local recreationists (using logging roads) bring negative comments from their clients and hurts their business [Ministry of Forests, Golden Forest District, 1992]. However, negative comments from clients do not necessarily translate into lost or declining tourism markets. If it could be demonstrated that tourism businesses are either losing existing clients or unable to attract new clients specifically because of harvesting activities, then the impacts on tourism of the harvest scenarios could be better projected. To date, in the Golden TSA, there is little information about the relationship between timber harvesting activities and tourism activities.

The three scenarios have similar implications for tourism and outdoor recreation activities. This does not mean that they will not have an impact in these areas, only that they are projected to have similar impacts over the planning horizon. The goal in this study is to help readers weigh the relative merits of the scenarios. No more timber harvesting is not a regional option. The intent is to compare the impact of the scenarios and not to project overall sectoral growth. Therefore, a projection for employment derived from local resident- and tourist-driven outdoor recreation activity is not included in this report. Appendix 8 provides a more detailed discussion of the issue of outdoor recreation and tourism activity and changes in the Golden TSA timber harvest.

Environmental Impacts[13]

Under all three scenarios, there would be a marked shift in the age-class distribution of forests within the TSA. Within four decades, most of the net operable mature forests

[13] The available information does not permit a distinction between regional and provincial impacts. Only the TSA impacts include an environmental account. See Appendix 5.

in the TSA will be converted to immature forests by timber harvesting activities. The most productive forests within the TSA, regarding biological diversity, occur within the net operable area. The end result will be a decrease in the most productive, mature forest stands and an overall reduction in the natural diversity of forests.[14]

In general, the widespread conversion of mature forests to immature forests under all three scenarios would cause changes in the distributions (both spatial and temporal) and population levels of many wildlife species. Habitat generalists (adaptable species that can use a wide range of habitat types, such as snowshoe hare, porcupine and dark-eyed junco) and species which use only immature forests (such as orange-crowned warbler and fox sparrow) will likely increase in numbers, but species dependent on mature and old-growth forests will decline. The greatest declines would occur among habitat specialists (species that have exacting habitat requirements, such as caribou and cavity nesting birds).[15]

Several raptors are endangered and require riparian and old growth habitats. Existing harvesting practices leave only a small opportunity to enhance these species [BC Hydro 1992].

Grizzly bear hunting is significant in most areas in the Golden TSA. However, the species is vulnerable because it requires large wilderness areas, has low reproductive rates, and is incompatible with human activity. Any increase in access and human contact will therefore lead to lower reproduction rates, increased culling, and increased poaching [BC Hydro 1992].

Caribou are highly dependent on mature high elevation forests and lower elevation old growth forest, where they feed on lichen litterfall and require both snow interception and thermal cover. Caribou will not tolerate dense successional stands [Ministry of Forests, Golden Forest District 1992].

The ungulate[16] capability and productivity in the Columbia Valley is high, but harvesting and land development limit these species. There are only limited, site-specific capabilities for ungulate management in the Big Bend area, where snow depths are high. Moose populations are currently low in the Big Bend area along the Mica reservoir because of inadequate forage. Although timber harvesting would open

[14] Personal communication. Ministry of Environment. Golden.
[15] Personal communication. Ministry of Environment. Golden.
[16] Ungulates in the Golden TSA include moose, elk, mountain caribou, white tail deer, mule deer, big horn sheep, and mountain goat.

up forest and produce forage in low to mid-elevation areas, this forage may not be accessible in winter due to snow depth. The impact on ungulate populations would therefore be indeterminate.

The furbearer harvest (primarily marten) in the area suggests high capabilities. However, this potential would be severely limited by harvesting. Since marten is highly dependent on old growth habitat, and since the remaining old growth forests (primarily ICH in the Big Bend area) are expected to be gone in 30 to 40 years, populations can be expected to decline. Wolverine and fisher populations are believed to be very low due to overtrapping in the past, and their known associations with old growth suggest that a recovery of populations would be difficult to achieve [BC Hydro 1992].

In summary, Scenario 1 would result in, over the short to long-term, moderate to drastic declines in the populations and viability of caribou, furbearers, big-game species, bird species, and fish. In the short-term, increasing forage potential could improve some ungulate populations. Offsetting this, increased access would increase the harvest of many popular species (assuming no road closures) and impact relatively undisturbed populations of moose and grizzly bear. In the long-term, old-growth dependent and related species (caribou, grizzly bear, cavity nesting birds) would be further endangered and in some cases extirpated. The increase in early successional forests would reduce thermal cover and snow canopies and negatively impact key big game species. Lower levels of forest cover would lead to a faster rate of snow melt in the Spring, increasing water flow into streams and placing sensitive fish habitat at risk.

Community Impacts

Population

Recent responses to changes in employment in the region indicate that there would be relatively minor or no population changes in the short-term. In the longer term, as harvest levels continued to decline, there likely would be some drop in population. CP Rail's loss of approximately 50 positions in Golden since 1991 resulted in some out-migration, but it was not believed to be significant. Some of those laid off were transferred to other company operations in the province, and these tended to be younger, single males, although some families did depart. In general, the impacts of the CP Rail layoffs were felt to be negligible and were offset by continued in-migration and growth in other sectors. Additionally, Evans reduced its staffing levels by

approximately 120 between 1988 and 1992 (although a majority of these jobs were restored in 1993) and there has been no decline of population as a result.

Local Government

In the Interim Guidelines [Ministry of Forests 1992], taxes and revenues are identified as the principal indicators of the impact on local government. A change in harvest levels could result in changes to the tax revenues flowing to local government from industry and residents and affect the community's ability to support infrastructure and service needs.

It is unlikely that Scenario 1 would result in a mill closure; therefore, there would be no change in the industrial tax base in the community. Job loss would fail to affect the residential property tax stream if, as was the case at CP Rail, dislocated workers tended to be younger people without property. If a portion of the dislocated workers did own homes in the region, the property market, assessment and tax revenues would probably be unaffected due to an overall housing shortage, a shortage of rental stock [Town of Golden, 1993] and a buoyant property market.

Social Fabric

Scenario 1 would not lead to significant social impacts in Golden, judging from the effects of past layoffs at Evans and CP Rail.

- Crime rates increased in Golden from 1983 and 1990, part of an overall trend to increasing crime in the province during that period. Golden's crime rate decreased in 1991, in spite of a rising unemployment rate of 9.3 per cent that was well above the provincial rate of 7.2 per cent. RCMP in Golden did not perceive a correlation between the crime rate and layoffs at CP or Evans during the 1990 to 1992 period.[17]
- The Ministry of Social Services' financial case load has increased significantly in the last four years, which again is seen as part of an overall provincial trend to increased welfare loads. Case loads in other service areas such as family counselling and rehabilitation programs have changed little over the same period of time. A Ministry representative could not identify any change in service case loads associated with layoffs at CP or Evans during the 1990 to 1992 period.[18]
- General health statistics, such as number of teen pregnancies and mental health outpatients, are declining in Golden [Ministry of Health, 1992].

[17] Personal communication, Bob Allison, Golden RCMP.
[18] Personal communication, Sue Rowe, Ministry of Social Services, Golden.

These indicators suggest that Golden has a reasonably stable social climate in spite of a changing economic climate.

Physical and Social Infrastructure

Continued population growth and positive indicators of health attest to Golden's stability as a community. There are several reasons for this.

- The community's economy has somewhat diversified into fast growing service sectors, and has succeeded in adding jobs faster than they have been lost in other sectors.

- In recent years Evans Forest Products, while cutting some jobs, has nevertheless conducted significant capital upgrades (with government assistance), thereby improving its technology, its scale economies, its competitiveness and, by extension, the security of its existing labour force.

- From what little is known about the behaviour of dislocated forest workers, the evidence suggests an inclination to remain in the community. A recent U.S. report [Northwest Forest Resource Council, 1993] gauging community impacts of the spotted owl program in the Pacific Northwest posited three likely responses by a dislocated forest worker: (1) stay in the community and hope to re-enter the forest labour force, surviving in the short-term on unemployment or social assistance; (2) choose retraining and seek employment close to home; or, (3) adopt a subsistence lifestyle relying on social assistance, food banks, and odd jobs. The unemployment rate in Golden appears to be consistent with this. The rate in Golden has been consistently higher than the rates in comparably-sized BC communities over the last five years. The fact that the unemployed remain in their community is a stabilizing influence.

- Between 1987 and 1992, incorporations outstripped bankruptcies in the region by four to one. Moreover, per capita incorporations were higher than the average for comparably sized communities in BC. The evidence suggests a relatively stable and growing small business and entrepreneur base in the community.

- Proximity to Calgary and its international airport is perceived by residents as one of the advantages of living in the community, and is known to be a factor influencing the in-migration of certain businesses and entrepreneurs.

- In the future, local economic development initiatives could give the community better control over its future development and improve stability. The Town of Golden and Area A of the Columbia Shuswap Regional District have recently established a formal economic development office in the community. Recently, the federal Community Futures Program was established in Golden. Both programs have mandates for diversification and assisting workers and entrepreneurs adjust and adapt to the changing economy.

- High quality social, health, and education services are available. Major facilities such as the hospital and college encourage long-term residency.

- The high quality of life (e.g. high quality environment, low crime rates, and low cost of living) and recreation attributes are attracting people to the region and provide a strong inducement to stay.

- Weak economies in surrounding regions have meant few opportunities for drawing people out of the region.

This combination of economic and social factors has provided the Golden region with a broad, stable community infrastructure. However, not all the predictors of community stability are favourable:

- Despite all the positive gains made in recent years, Golden's economy lacks diversity and is potentially unstable. The community is dependent on one sector (forestry), one company (Evans), and on two products (dimension lumber and plywood). The lack of diversity leaves the community highly susceptible to major events affecting Evans Forest Products.

- Golden's population, though aging, is still relatively young compared to BC's, and this could lead to instability unless jobs are available to absorb new labour force entrants. Additionally, the lower proportion of seniors (considered a stabilizing influence on the community) means that Golden does not enjoy the benefits accruing

to those communities with more substantial retirement populations, such as higher levels of relatively secure investment and pension incomes.

- Golden has a large component of skilled and educated residents, but an equally large component of poorly educated, unskilled workers. This latter group may be unable to adjust to a new set of economic realities if their jobs should disappear, which could destabilize the community.

To date, none of these factors has negatively impacted the community, and any transitions required have been made smoothly. However, problems could occur in the future. If they do, the risks of building the community on a narrow economic and business base could be exposed, and result not just in job loss but in adjustment problems in other areas of community life.

In summary, Golden is a relatively stable community and the job losses associated with Scenario 1, while significant for those losing their jobs, are not likely to create a significant impact on the overall social and community base.

Aboriginal Impacts

There is no aboriginal population or identifiable aboriginal commercial activity in the Golden TSA at present. There are, therefore, no regional aboriginal employment, income, subsistence, or social impacts associated with the harvest scenarios.

The major aboriginal impacts of the harvest scenarios involve historical and cultural sites. The following factors have affected or will affect aboriginal values in this regard:

- Although numerous archaeological sites have been identified, a documented inventory of historically and culturally significant sites in the Golden TSA is not available. The Ktunaxa/Kinbasket Tribal Council is cataloguing sites, but data collection is still proceeding. Until this is completed, a relevant impact analysis is not possible.

- The major impacts on aboriginal values have likely already occurred through Columbia River damming, the Mica Dam pondage and other human activity, especially in the Columbia Valley. The dams and other industrial activity on the Columbia, both in Canada and the United States, long ago wiped out the salmon fishery and any possibilities that it could again provide subsistence. The Mica Dam

pondage flooded most of the valley bottom in the Big Bend area and presumably any aboriginal historical sites lie beneath Kinbasket Lake. Lastly, farming and settlement activity in the Columbia Valley has disturbed much of the land and altered an indeterminate number of sites.

- There are no specific aboriginal historical considerations given in the current forest management regime. Consequently, there will be no discernible difference in impact on aboriginal values among the three harvest scenarios from changes in harvest volumes, since they all assume a continuation of current management practises.

The other major aboriginal issue is the comprehensive land claim covering the Golden TSA. Until such time as the negotiations proceed on this matter, there is no way of gauging the impact of alternative harvest levels. Since no comprehensive land claim has yet been resolved in this BC, there is no precedent which could serve as a reference point for assessing a potential impact.

4.2 PROVINCIAL IMPACTS

Economic Impacts

Provincial employment and employment income estimates for Scenario 1 appear in Table 4-2. Appendix 4 explains the co-efficients and multipliers used to arrive at these results.

The estimated current direct employment in BC consists of the following:

- TSA direct employment of 618.
- Wood River Forest Inc. processing employment of 35 associated with its licence apportionment of 61 533 m^3 [Ministry of Forests Golden Forest District, 1992].
- Direct employment of 15 associated with Evans' shipment of approximately 247 000 m^3 of chips to the Celgar pulp mill[19].
- Direct employment of 24 associated with Evans' shipment of 97 826 m^3 of cedar from its Donald mill to other facilities in BC for further value-added processing[20].

[19] In 1992, Evans shipped 247 403 m^3 of chips from its plywood mill and sawmill. 78 per cent (192 974 m^3) of which is attributable to the Golden TSA. Based on an employment coefficient for Interior pulp and paper production of .08 per 1 000 m^3 [Ministry of Forests Economics and Trade Branch, 1993], direct employment is estimated to be 15 PYs.

[20] In 1992, Evans shipped the equivalent of 97 826 m^3 of lumber to other mills in BC for further processing. We have applied a sawmill coefficient of 0.32 per m^3 [Ministry of Forests Economics and Trade Branch, 1993] for the 78 per cent of this wood attributable to the Golden TSA, and estimated employment at 24 PYs.

Total current direct provincial employment attributable to harvesting Golden TSA timber is therefore estimated to be 692.

Table 4-2: Scenario 1 - Provincial Economic Impacts[1]

		Employment (PYs/Year)			Employment Income ($1992 Millions/Year)		
Year	Harvest '000 m^3	Direct	Indirect/ Induced[2]	Total	Direct	Indirect/ Induced[3]	Total
Current	650	692	1 038	1 730	$21.0	$22.8	$43.8
0	605	644	966	1 610	19.5	21.2	40.7
10	543	578	867	1 445	17.5	19.0	36.5
20	486	517	776	1 293	15.7	17.0	32.7
30	436	464	696	1 160	14.1	15.3	29.4
40	390	415	623	1 038	12.6	13.7	26.3
50	349	372	557	929	11.3	12.2	23.5
60	313	333	500	833	10.1	11.0	21.1
70	309	329	493	822	10.0	10.8	20.8
80	309	329	493	822	10.0	10.8	20.8

[1] Provincial impacts include impacts both inside and outside the TSA.

[2] Provincial indirect and induced employment was based on Ministry of Forests' employment multiplier of 2.5. See Appendix 4.

[3] Indirect income is the sum of TSA indirect income (based on an average Golden wage) and provincial indirect income (based on an average BC wage). See Appendix 4.

In Scenario 1, direct provincial forest sector employment would fall off immediately by 48 PYs below present employment levels. There would be a further 72 PYs of associated indirect jobs lost, leading to a total decline of 120 jobs in the first decade. The corresponding direct income and indirect employment income losses would be $1.5 million and $1.6 million, respectively. By year 10, a further 165 total jobs and $4.2 million in total employment income is lost. By year 70, when the long-run harvest level is reached, there would be a cumulative loss of 908 direct and indirect jobs.

Environmental Impacts

There are no known significant environmental attributes, either in the form of habitats or wildlife, in the Golden TSA that are unique in BC (however, certain biological attributes, such as genotypes may be locally unique). While the regional environmental impacts previously discussed may have some value for the province as a whole, its

extent and significance is unknown. Possible non-use values for the area, which would help establish its provincial significance, are also unknown.

Provincial Government Revenue Impacts

Total provincial government revenue impacts appear in Table 4.3. The assumptions made in compiling the figures are discussed in Appendix 10. Current annual provincial government revenues are approximately $14.0 million. The first decade harvest reduction results in a loss of $1 million in annual revenue, and a further $1.2 million is lost per year by the second decade. A total of $7.3 million would be lost annually by the time the long-term harvest level is reached in year 70.

Table 4-3: Scenario 1 - Provincial Revenue Impacts ($1992 Millions/Year)

Year	Resource Revenues[1]	Personal Income Tax[2]	Other Taxes[3]	Total
Current	$5.8	$4.4	$3.8	$14.0
0	5.4	4.1	3.5	13.0
10	4.9	3.7	3.2	11.8
20	4.3	3.3	2.8	10.4
30	3.9	2.9	2.5	9.3
40	3.5	2.6	2.3	8.4
50	3.1	2.4	2.0	7.5
60	2.8	2.1	1.8	6.7
70	2.8	2.1	1.8	6.7
80	2.8	2.1	1.8	6.7

[1] Includes stumpage and other revenues.
[2] Includes provincial share of taxes on direct, indirect, and induced employment income.
[3] Includes logging, corporate income, corporate capital, sales, property and electricity taxes.

5.0 SCENARIO 2 IMPACT ASSESSMENT

5.1 TIMBER SUPPLY AREA IMPACTS

Economic Development

Employment and employment income impacts of Scenario 2 harvest levels are shown in Table 5-1.

Table 5-1: Scenario 2 - TSA Economic Impacts

	Harvest	Employment (PYs/Year)			Employment Income ($1992 Millions/Year)		
Year	'000 m^3	Direct	Indirect	Total	Direct	Indirect	Total
Current	650	618	488	1 106	$18.7	$10.3	$29.0
0	650	618	488	1 106	18.7	10.3	29.0
10	559	531	419	950	16.1	8.8	24.9
20	490	466	368	834	14.1	7.8	21.9
30	428	407	321	728	12.3	6.8	19.1
40	374	355	281	636	10.8	5.9	16.7
50	326	310	245	555	9.4	5.2	14.6
60	309	294	232	526	8.9	4.9	13.8
70	309	294	232	526	8.9	4.9	13.8
80	309	294	232	526	8.9	4.9	13.8

In the first decade, there would be no change from the current harvest level of 650 000 m^3. Additionally, the long-run harvest level would be reached by year 60. As a result, almost all harvest level adjustments in Scenario 2 will occur in a relatively short 50 year period, between year 10 and year 60. In effect, short-term and long-term stability is obtained at the cost of relatively more rapid declines in medium term harvest levels (approximately 12 per cent per decade).

In the first decade direct and indirect employment would remain unchanged at 1 106 and employment income at $29 million. By year 10, 156 total jobs and $4.1 million in total employment income is lost. By year 60, when the long-run harvest level is reached, there would be a cumulative loss of 580 direct and indirect jobs.

Environmental Impacts

The TSA environmental impacts of Scenario 2 are similar to those discussed under Scenario 1. If current forest management practices are continued, there will be a marked shift in the age-class distribution of forests within the TSA. Within four decades, most of the net operable mature forests in the TSA would be converted to immature forests by timber harvesting activities. The most productive forests within the TSA occur within the net operable area. The end result will be a decrease in the most productive, mature forest stands and an overall reduction in the natural diversity of forests.

In general, the widespread conversion of mature forests to immature forests would cause changes in the distributions and overall population levels of many wildlife species. Habitat generalists and species which use only immature forests would likely increase in numbers, but species dependent on mature and old-growth forests would decline. The greatest declines are expected to occur among habitat specialists - species that have exacting habitat requirements.

Community Impacts

The community impacts of Scenario 2 would be similar to those of Scenario 1, with the exception that, since there would be fewer job reductions in the short-term (i.e. first 20 years), any impacts would likely be deferred.

Aboriginal Impacts

The aboriginal impacts of Scenario 2 are similar to those of Scenario 1.

5.2 PROVINCIAL IMPACTS

Economic Impacts

The provincial employment and employment income impacts of Scenario 2 appear in Table 5-2. Maintaining the harvest at current levels would maintain employment and employment income in the first decade. However, the loss of provincial employment and employment income thereafter would be substantial. By year 10, 242 total jobs and $6.2 million in total employment income is lost. By year 60, when the long-run

harvest level is reached, there would be a cumulative loss of 908 direct and indirect jobs.

Table 5-2: Scenario 2 - Provincial Economic Impacts

		Employment (PYs/Year)			Employment Income ($1992 Millions/Year)		
Year	Harvest '000 m^3	Direct	Indirect/ Induced	Total	Direct	Indirect/ Induced	Total
Current	650	692	1 038	1 730	$21.0	$22.8	$43.8
0	650	692	1 038	1 730	21.0	22.8	43.8
10	559	595	893	1 488	18.0	19.6	37.6
20	490	522	782	1 304	15.8	17.2	33.0
30	428	456	683	1 139	13.8	15.0	28.8
40	374	398	597	995	12.1	13.1	25.2
50	326	347	521	868	10.5	11.4	21.9
60	309	329	493	822	10.0	10.8	20.8
70	309	329	493	822	10.0	10.8	20.8
80	309	329	493	822	10.0	10.8	20.8

Environmental Impacts

The provincial environmental impacts of Scenario 2 are similar to Scenario 1 impacts.

Provincial Government Revenue Impacts

The provincial government revenue impacts of Scenario 2 are shown in Table 5-3. Current annual provincial government revenues are approximately $14.0 million. There is no loss of revenues in the first decade. By the second decade total annual revenues of $2.0 million would be lost. A total of $7.3 million would be lost per year by the time the long-term harvest level is reached in year 60.

Table 5-3: Scenario 2 - Provincial Revenue Impacts ($1992 millions/Year)

Year	Resource Revenues	Personal Income Tax	Other Taxes	Total
Current	$5.8	$4.4	$3.8	$14.0
0	5.8	4.4	3.8	14.0
10	5.0	3.8	3.2	12.0
20	4.4	3.3	2.8	10.5
30	3.8	2.9	2.5	9.2
40	3.3	2.5	2.2	8.0
50	2.9	2.2	1.9	7.0
60	2.8	2.1	1.8	6.7
70	2.8	2.1	1.8	6.7
80	2.8	2.1	1.8	6.7

6.0 SCENARIO 3 IMPACT ASSESSMENT

6.1 TIMBER SUPPLY AREA IMPACTS

Economic Development

Forestry employment and employment income impacts of Scenario 3 harvest levels are shown in Table 6-1.

Table 6-1: Scenario 3 - TSA Economic Impacts

	Harvest	Employment (PYs/Year)			Employment Income ($1992 Millions/Year)		
Year	'000 m^3	Direct	Indirect	Total	Direct	Indirect	Total
Current	650	618	488	1 106	$18.7	$10.3	$29.0
0	484	460	363	823	13.9	7.7	21.6
10	484	460	363	823	13.9	7.7	21.6
20	484	460	363	823	13.9	7.7	21.6
30	484	460	363	823	13.9	7.7	21.6
40	431	409	323	732	12.4	6.8	19.2
50	388	369	291	660	11.2	6.1	17.3
60	348	331	261	592	10.0	5.5	15.5
70	311	295	233	528	8.9	4.9	13.8
80	309	294	232	526	8.9	4.9	13.8

Projected Scenario 3 harvest levels are characterized by an immediate 25 per cent drop, followed by a steady-state harvest between year 0 and year 40, and then 10 per cent per decade declines until the long-run harvest level is reached in year 80. In Scenario 3, harvest level changes occur immediately and in the long-term, while in the short and medium terms harvest levels do not change.

In Scenario 3, direct forest sector employment in the TSA would fall off immediately by 158 PYs below present employment levels. There would be a further 125 PYs of associated indirect jobs lost, leading to a total decline of 283 jobs in the first decade. The corresponding direct income and indirect employment income losses would be $4.8 million and $2.6 million, respectively. By year 70, when the long-run harvest level is reached, there would be a cumulative loss of 580 direct and indirect jobs.

Job losses could be significantly higher if the harvest decline forced one or both of Evans' mills below threshold levels. In particular, the closure of the plywood plant would be devastating in the short-term for the job and income base of the community. However, the long run harvest level is the same under all three scenarios, so adjustments in processing capacities (including the possibility of plant closure) would have to be faced eventually, assuming that alternative sources of supply did not become available.

Environmental Impact

A major difference between Scenario 3 and the first two scenarios is that it would allow resource managers greater flexibility to manage for non-timber resources during the first two decades. An added benefit of Scenario 3 could result if, within the next 20 years, it was decided to further reduce the timber supply in decades four through seven in order to manage the forest for more non-timber resources. Scenario 3 does not foreclose on the availability of non-timber management options as quickly as the other two scenarios.

Community Impacts

Population

Compared to scenarios 1 and 2, Scenario 3 would have a more dramatic impact in the first two decades, which could result in some noticeable population adjustments. In decades four to seven, the impacts would be less than either Scenario 1 or 2.

Other activities which could replace, on a short-term basis, some of the logging and mill jobs include silviculture employment and/or Trans Canada Highway construction activity. Other jobs that are being created today are in the service sector, and the evidence indicates that forest workers infrequently take jobs in emerging industries such as tourism. Some retraining and absorption would occur, but only to a limited extent. It is possible that some displaced workers could be brought back into the forest work force over time as attrition made opportunities available.

Local Government

Scenario 3 would have some effect on local government tax revenues only if one of the mills were to close. As shown in Table 6-2, the assessed value of the Donald mill is

higher than the assessed value of the Golden mill, but gross municipal taxes currently paid by each is similar. In the event of closure the BC Assessment Authority would

TABLE 6-2: Assessed Values and Municipal Taxes of Evans' Mills in Golden and Donald, 1993[1]

Mill	Assessed Value	Gross Taxes	Closure Assessment	Closure Taxes	Net Change in Taxes
Golden	$2 957 000	$115 958	$1 282 000	$50 273	($65 685)
Donald	$4 331 000	$116 198	$1 382 000	$37 078	($79 120)

[1] Includes only land and buildings of mill site, and not other land holdings in the area.

Source: Personal Communication with Town of Golden, BC Assessment Authority Cranbrook, BC Government Agent Golden.

reduce the assessments as shown, causing a reduction in local tax payments. The loss in taxes would be $79 120 in Donald and $65 685 in Golden. However, major industries (consisting primarily of Evans' operations) in the region contribute less than five per cent of total taxes collected by the municipality; the estimated revenue shortfalls would account for between two and three per cent of current budgets.

A more significant impact on local government revenues could result from population loss and the effect this would have on business and property taxes.

Social Fabric

Because there has been no comparable job loss in recent times in Golden, the effect on the social fabric of the community is difficult to gauge. The immediate and dramatic harvest reduction, and the job loss it would create, could be more socially disruptive than the immediate impacts in scenarios 1 and 2. On the other hand, after the initial adjustment, the community would benefit from several decades during which timber harvests and forest-related employment would be stable, and, from year 30 to year 70, at higher levels than in scenarios 1 and 2.

Aboriginal Impacts

The aboriginal impacts of Scenario 3 are similar to those of Scenario 1.

6.2 PROVINCIAL IMPACTS

Economic Impacts

The provincial employment and employment income impacts associated with Scenario 3 are shown in Table 6-3. Direct provincial forest sector employment would fall off immediately by 177 PYs below present employment levels. There would be a further 265 PYs of associated indirect jobs lost, leading to a total decline of 442 jobs in the first decade. The corresponding direct income and indirect employment income losses would be $5.4 million and $5.8 million, respectively. By year 80, when the long-run harvest level is reached, there would be a cumulative loss of 908 direct and indirect jobs.

Table 6-3: Scenario 3 - Provincial Economic Impacts

		Employment (PYs/Year)			Employment Income ($1992 Millions/Year)		
Year	Harvest '000 m^3	Direct	Indirect/ Induced	Total	Direct	Indirect/ Induced	Total
Current	650	692	1 038	1 730	$21.0	$22.8	$43.8
0	484	515	773	1 288	15.6	17.0	32.6
10	484	515	773	1 288	15.6	17.0	32.6
20	484	515	773	1 288	15.6	17.0	32.6
30	484	515	773	1 288	15.6	17.0	32.6
40	431	459	688	1 147	13.9	15.1	29.0
50	388	413	620	1 033	12.5	13.6	26.1
60	348	370	556	926	11.2	12.2	23.4
70	311	331	497	828	10.0	10.9	20.9
80	309	329	493	822	10.0	10.8	20.8

Environmental Impacts

The provincial environmental impacts of Scenario 3 would be similar to the impacts of the other two scenarios.

Provincial Government Revenue Impacts

The provincial government revenue impacts of Scenario 3 appear in Table 6-4. Current annual provincial government revenues are approximately $14.0 million. The immediate harvest reduction results in an annual loss of $3.6 million in revenue. A total of $7.3 million is lost per year by the time the long-term harvest level is reached in year 80.

Table 6-4: Scenario 3 - Provincial Revenue Impacts ($1992 millions/Year)

Year	Resource Revenues	Personal Income Tax	Other Taxes	Total
Current	$5.8	$4.4	$3.8	$14.0
0	4.3	3.3	2.8	10.4
10	4.3	3.3	2.8	10.4
20	4.3	3.3	2.8	10.4
30	4.3	3.3	2.8	10.4
40	3.9	2.9	2.5	9.3
50	3.5	2.6	2.3	8.4
60	3.1	2.3	2.0	7.4
70	2.8	2.1	1.8	6.7
80	2.8	2.1	1.8	6.7

7. SUMMARY AND CONCLUSIONS

7.1 TIMBER SUPPLY AREA IMPACTS

The TSA-level impacts of the three harvest scenarios are summarized in Table 7-1.

- The differences in employment impacts between scenarios 1 and 2 are small, although initial impacts occur a decade later in Scenario 2. Scenario 3 shows sizeable direct and indirect job loss in the first two decades when compared to the other scenarios. By the third decade employment levels under all three scenarios are comparable, and by the seventh decade Scenario 3 would generate more jobs than either Scenarios 1 or 2, because of its higher harvest levels.
- Employment income distributions follow the same pattern as the employment distributions.
- A continuation of existing harvesting practises is unlikely to affect most but not all recreational attributes of the Golden TSA. Most recreation activities would be unaffected by harvesting under any of the scenarios. Wildlife viewing and hunting could benefit in the short-term, especially under scenarios 1 and 2, if increased access is not impeded by road closures. In the long-term, however, declines in wildlife populations under all three scenarios would negatively impact these activities.
- The relationship between timber harvesting and tourism activities in the Golden TSA is poorly understood. While continued harvesting may negatively affect key tourism attributes and thereby cause job and income losses, how and when this could occur is unknown.
- Scenarios 1 and 2 would be very similar in community, environmental and aboriginal community impacts. Population, local government and social fabric factors would be largely unaffected in the first decade. Some short-term environmental benefits could accrue through ungulate enhancement. In the long-term, some habitats and key species would decline and face local extirpation.
- Scenario 3 would lead to some dramatic short-term community and social adjustments. Golden's population would likely decrease and the demand for social and employment services would probably increase. However, after the first decade, impacts would be less than in either Scenario 1 or 2. Scenario 3 affords the greatest short-term flexibility for managing the forest for non-timber values, because it maintains for longer the option of further reducing future harvest levels. However,

Table 7-1: Summary of TSA Accounts

		Scenario 1				Scenario 2				Scenario 3			
		Years from Present				Years from Present				Years from Present			
		0	10	20	60	0	10	20	60	0	10	20	60
Harvest in '000 m^3		605	543	486	313	650	559	490	309	484	484	484	348
Economic Account													
Employment (PY/Year)	Direct	575	516	462	297	618	531	466	294	460	460	460	331
	Indirect	454	407	365	235	488	419	368	232	363	363	363	261
	Total	1 029	923	827	532	1 106	950	834	526	823	823	823	592
Employment Income ($1992 Millions/Year)	Direct	$17.4	$15.6	$14.0	$9.0	$18.7	$16.1	$14.1	$8.9	$13.9	$13.9	$13.9	$10.0
	Indirect	9.6	8.6	7.7	5.0	10.3	8.8	7.8	4.9	7.7	7.7	7.7	5.5
	Total	$27.0	$24.2	$21.7	$14.0	$29.0	$24.9	$21.9	$13.8	$21.6	$21.6	$21.6	$15.5
Community Account													
Population		• little or no change				• no change				• some short term outmigration			
Local Government		• no change				• no change				• slightly adverse in short term if mill closes			
Social Fabric		• minor impact				• minor impact				• some increased short term demand for employment, training and other social services			
Environmental Account													
Habitats		• widespread conversion of old growth forests to younger forests, especially at lower elevations				• widespread conversion of old growth forests to younger forests, especially at lower elevations				• same long-term impacts as scenarios 1 and 2; however, affords the greatest short-term (first 20 years) flexibility for managing the forest for biological diversity			
Wildlife		• some short term enhancement of some ungulates; long term declines in key big game and old growth dependent species				• some short term enhancement of some ungulates; long term declines in key big game and old growth dependent species							
Aboriginal Account		• no impact				• no impact				• no impact			

the environmental impact would be greater in decades four to seven than in the other scenarios.

- There may be no long-term difference in environmental impacts among the three scenarios because the overall level of timber eventually harvested would be the same in each case.
- The three scenarios would have no impact on aboriginal communities or activities, as there are none in the TSA. However, harvesting under all scenarios could affect sites of historical and cultural significance. The Ktunaxa/Kinbasket Tribal Council has a comprehensive land claim which includes the TSA.

7.2 PROVINCIAL IMPACTS

The provincial impacts of the three harvest scenarios are summarized in Table 7-2.

- Provincial employment, income, and government revenues would decline in the same manner as the regional impacts.
- Under Scenario 1, an immediate harvest decline of seven per cent in the first decade results in a total employment loss of 120, and a total employment income loss of $3.1 million. Scenario 2 maintains the current harvest, so there is no immediate loss of jobs or income. Scenario 3 shows an immediate loss of total jobs of 442, and a loss of total employment income of $11.2 million.
- In all three scenarios the decline in harvest from the present level of 650 000 m^3 to the long-run harvest level of 309 000 m^3 would result in a loss of 363 direct forest jobs, and a further loss of 545 indirect and induced jobs, for a total job loss to the province of 908. The associated total income loss is estimated to be $23.0 million. Provincial government revenues would decline by $7.3 million per year by the time the long-run harvest is reached. Although Scenario 3 would involve the largest initial impacts, Scenario 2 would experience the most rapid impacts between years 20 and 60. The impacts of Scenario 1 would lie between the other two scenarios.

7.3 CONCLUDING REMARKS

The forest industry is the largest component of the economic base of the communities in the Golden TSA. Both Golden and Donald Station are economically centred on the operations of one company, Evans Forest Products Limited. Golden TSA timber supply is likely to decline in future, and other sources of supply may become

increasingly expensive. Each of the three timber supply scenarios examined in this report could lead to significant losses in jobs, employment income, and provincial government revenues, although the timing of the losses would differ in each case. These impacts could be mitigated to some extent by growth in tourism and the in-migration of people attracted by the area's natural attributes. However, it is unlikely that these would replace much of the lost income in the near term.

Environmental impacts under each scenario would probably be similar over the long-term, although Scenario 3 would involve fewer short-term impacts and would allow greater flexibility in addressing environmental considerations. There would be no impact on aboriginal communities or activities.

A final point worth noting is that the analysis in this report considers only impacts attributable to changes in the harvest level, and assumes no change in current economic and technical conditions, such as the size of the operable land base, technology, harvesting costs, and timber values. This report therefore represents a current snapshot, and changing conditions in the future may warrant additional analysis.

Table 7-2: Summary of Provincial Accounts - Golden TSA

		Scenario 1				Scenario 2				Scenario 3			
		Years from Present				Years from Present				Years from Present			
		0	10	20	60	0	10	20	60	0	10	20	60
Harvest in m^3		605	543	486	313	650	559	490	309	484	484	484	348
Economic Account													
Employment (PY/Year)	Direct	644	578	517	333	692	595	522	329	515	515	515	370
	Indirect	966	867	776	500	1 038	893	782	493	773	773	773	556
	Total	1 610	1 445	1 293	833	1 730	1 488	1 304	822	1 288	1 288	1 288	926
Employment Income ($1992 Millions/Year)	Direct	$19.5	$17.5	$15.7	$10.1	$21.0	$18.0	$15.8	$10.0	$15.6	$15.6	$15.6	$11.2
	Indirect	21.2	19.0	17.0	11.0	22.8	19.6	17.2	10.8	17.0	17.0	17.0	12.2
	Total	$40.7	$36.5	$32.7	$21.1	$43.8	$37.6	$33.0	$20.8	$32.6	$32.6	$32.6	$23.4
Provincial Revenue Account ($1992 Millions/Year)													
Stumpage & Royalties		$5.4	$4.9	$4.3	$2.8	$5.8	$5.0	$4.4	$2.8	$4.3	$4.3	$4.3	$3.1
Personal Income Taxes		4.1	3.7	3.3	2.1	4.4	3.8	3.3	2.1	3.3	3.3	3.3	2.3
Other Taxes		3.5	3.2	2.8	1.8	3.8	3.2	2.8	1.8	2.8	2.8	2.8	2.0
Total		$13.0	$11.8	$10.4	$6.7	$14.0	$12.0	$10.5	$6.7	$10.4	$10.4	$10.4	$7.4

APPENDIX 1 - GLOSSARY

Allowable Annual Cut (AAC)	The volume of timber which may be cut each year from a forest management unit (e.g., a TSA), set by the Chief Forester in accordance with Section 7.0 of the Forest Act.
AAC Apportionment	The allocation by the Minister of the AAC for a TSA among timber tenures in accordance with Section 8.0 of the Forest Act.
Biodiversity	Biological Diversity. The diversity of plants, animals and other living organisms and their habitats measured by factors such as genetic variability, number of species, and variation in species composition.
Biogeoclimatic Zones	Areas which are defined by similar biological, physical and atmospheric characteristics.
Constant (or Real) Dollar	The effects of inflation are removed from the current value of a dollar.
Cut Block Adjacency	Integrated management guidelines restrict harvesting in areas adjacent to a cut block until that cut block has satisfied certain regeneration requirements (i.e., green-up requirements).
Direct Activity	Income and employment impacts in the industry under study, in this case the forestry industry (i.e., harvesting, transportation, silviculture, processing, and government).
Economic Base Theory	In economic base theory, the basic or direct sector(s) is seen as the driving force in the local economy. The basic or direct sector is an industry or group of industries in a community or region which sells its output or services to buyers outside the region. Basic sector income therefore flows into the region from outside. This could be related to a forest company which sells 2x4s, a hotel which caters to outside visitors, or pension payments from Ottawa to local residents. The non-basic or indirect sector supplies goods and services to the direct sector and caters to the demands of employees of the direct and indirect sectors.
Ecosystem	Any complex of living organisms together with all the other biotic and abiotic (non-living) factors which affect them.
Environmentally Sensitive Area	Notable non-timber values, fragile or unstable soils, or areas that have problems in establishing a new stand or where timber harvesting may result in land slides.
Ecoprovince	An area of the earth's surface characterized by very broad ecological interactions between the four major environmental components of the ecosystem: air, water, land and biota.

Green-up Period	The time needed for a stand of trees to reach a desired condition (i.e., height) to ensure maintenance of water quality, wildlife habitat, soil stability or aesthetics. Green-up requirements refer to the desired conditions.
Indirect Activity	Spin-off income and employment effects from businesses which provide intermediate goods or services to the direct sector.
Induced Activity	The economic activity created through the incomes of workers in the direct and indirect businesses, who spend their earnings on a broad range of consumption and investment goods and services.
Integrated Resource Guidelines	Guidelines requiring that forest management activities (such as harvesting, road building and silviculture treatments) be conducted in a special way to protect or enhance timber and non-timber forest resource values.
Long-run Harvest	Refers to timber harvesting levels whereby the volume of timber harvested in any given period can be replaced by a similar volume from regenerated stands within the same period.
Multiple Accounts Analysis	A method of socio-economic evaluation that accounts for both measurable and non-measurable benefits and costs, and compares the impacts of different objectives on several socio-economic features or accounts.
Multipliers	Co-efficients which indicate the historical relationship between sectors and impact categories in an economic impact model. For example, a total employment multiplier of 2.5 for the forest industry indicates that there are 1.5 indirect/induced jobs attributable to 1 forest industry job.
Person-year (PY)	A standard measure of employment that takes into account part-time, seasonal, and over-time work. For example, if an employee works full-time for six months, he or she will account for 0.5 PY of employment. Using person-years allows different types of employment to be compared on a similar basis. In this report, 1 800 hours per year represents a person-year.
Protected Area	An area designated under the B.C. Protected Areas Strategy for protection in its current state, based on special physical and environmental qualities it may possess.
Riparian Zone	The stream bank and flood plain adjacent to streams or water bodies, with particular reference to the vegetation.
Timber Supply Area (TSA)	An integrated resource management unit established in accordance with Section 6.0 of the Forest Act.
Watershed	An area drained by a particular stream or river. A large watershed may contain several smaller watersheds.
Ungulates	Hoofed mammals. In the Golden TSA, these include moose, elk, mountain caribou, white tail deer, mule deer, big horn sheep, and mountain goat.
Values	The properties of an object or system which give it importance, utility or worth.

APPENDIX 2 - LIST OF CONTACTS

In-person Interviews

- Darcy Monchak, Ministry of Forests, Golden
- Keith Monroe, Ministry of Forests, Golden
- Dave Clapperton, Ministry of Forests, Golden
- Bob Ferguson, Ministry of Environment, Golden
- Len Pettman, Evans Forest Products, Golden
- Laird Pittman, Evans Forests Products, Golden
- Manson Galligan, Evans Forests Products, Golden
- Fred Demmon, Mayor of Golden, Golden
- Phil Taylor, Administrator Town of Golden, Golden
- Paul Hambruch, Golden and District Economic Development Commission, Golden

Telephone Interviews

- Dwayne Weber, Evans Forest Products, Donald
- Jim Mackay, Evans Forest Products, Golden
- Jim McKinnon, Canadian Pacific Railway, Golden
- Brian Amies, Ministry of Forests, Golden
- Jim Oseychuk, Ministry of Forests, Golden
- Kurt Huettmeyer, Ministry of Forests, Revelstoke
- Fred Thiessen, Ministry of Forests, Nelson
- Alison Coyne, Ministry of Forests, Victoria
- Lisa Gow, Ministry of Tourism, Victoria
- Ray Kenny, Archaeology Branch, Victoria
- Brenda Corrigan, Canada Parks Service, Revelstoke
- Jaon Batyski, Canada Parks Service, Radium
- Doug Greenoff, Columbia Shuswap Regional District, Salmon Arm
- Kurt Broughton, B.C. Assessment Authority, Cranbrook
- Don Fraser, Cariboo Lumber Manufacturers' Association, Williams Lake
- Gordon Rattray, Interior Lumber Manufacturers' Association, Kelowna
- Art Kempthorne, Council of Forest Industries, North Vancouver
- Sue Rowe, Ministry of Social Services, Golden
- Bob Allison, RCMP, Golden
- Alan Hunter, Ktunaxa/Kinbasket Tribal Council, Marysville

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APPENDIX 4 - ECONOMIC IMPACT METHODOLOGY

The economy is a system of inter-related sectors. Any change in the final demand of a business or industry will induce a sequence of changes or impacts in production and employment in other sectors of the economy. There are three impact categories: direct; indirect; and induced. The direct impacts are changes in income and employment in those industries where final demand has changed. In this analysis, the focus is on the forest industry. Spending by producers of final goods and services generates demand further up the production chain, so any change in final forest industry demand will bring about further changes in output and employment among suppliers of intermediate goods. Successive rounds of changes will occur; taken in aggregate, these constitute the indirect impacts. Finally, additional economic impacts will occur as the result of changes in spending by persons receiving income from industries subject to direct and indirect impacts. For example, the spending of forest company employees supports employment in local businesses. The successive changes in output and employment occurring through this channel constitute the induced impacts.

This study examines economic impacts at the TSA and province-wide levels. The approach used in described below.

TSA-LEVEL IMPACTS

Direct Employment

- The Ministry of Forests' Golden District Office [1992] surveyed local forest industry employers to obtain direct forest sector employment. This employment was divided by the timber harvest to obtain an employment co-efficient of 1.0 PY per 1 000 m^3. Processing jobs, either in the Evans sawmill or plywood plant, account for 65 percent of the PYs and the remainder come from logging, trucking, silviculture and Ministry of Forests. The authors of this report modified the 1.0 PY per 1 000 m^3 estimate to take account of Wood River Forest Inc., which does not process its wood (9.5 percent of total AAC) in the Golden TSA. However, its harvesting and contract employment does accrue to the region. When a regional processing co-efficient of 0.52 PY per 1 000 m^3 (based on Evans' direct experience) was applied to the Wood Forest Inc. harvest of 61 533 m^3, 32 PYs are assumed to be located outside the TSA, leaving the Golden TSA with a forest industry employment of 618. The adjusted employment co-efficient for the Golden TSA is 0.95. This was used to estimate the forest sector employment impacts of timber harvest level changes.

Direct Income

- Forest sector employment income was estimated by multiplying an industry average after tax annual income by the PYs of employment. The average 1992 annual income (before benefits) for a B.C. forest industry employee is $41 010 [Price Waterhouse 1993]. This average is used for both TSA and provincial impacts. An effective tax rate of 26.2 per cent was applied to derive an after-tax income of $30 269.

Indirect Income

- Direct income was multiplied by an income multiplier of 1.55 to estimate TSA-level total direct and indirect income. The multiplier was developed specifically for Golden [Horne and Robson 1993].

Indirect Employment

- Indirect employment for the TSA was obtained by dividing the estimated indirect employment income by an average annual after-tax income of $21 080 for Golden's indirect sector in 1992. This figure was developed by the Ministry of Finance and Corporate Relations.

PROVINCIAL-LEVEL IMPACTS

Direct Employment

- The estimated direct provincial forest sector employment co-efficient was 1.06 PY per 1 000 m^3 (see further discussion on page 36).

Direct Income

- Direct income is calculated as described in the TSA-level section.

Indirect/Induced Employment

- Multiplying direct employment by the Ministry of Forests' forest sector employment multiplier of 2.5 provides an estimate of total employment. Indirect and induced employment is the difference between the total and direct figures.

Indirect/Induced Income

- Indirect/induced employment income was estimated by summing TSA and non-TSA indirect/induced income. For the non-TSA portion, this is the product of incremental provincial indirect employment (provincial indirect employment less TSA indirect employment) multiplied by an after-tax (and before benefits) wage of $22 673. This wage was derived by applying an effective tax rate of 20.54 per cent to Statistics Canada's average annual aggregate gross income for B.C. in 1992 of $28 553.

APPENDIX 5 - ENVIRONMENTAL ACCOUNT METHODOLOGY

Methodology

The Ministry of Forests' Interim Evaluation Guidelines specify consideration of use and existence values in an Environmental Account. However, a detailed approach similar to that described for the Economic Development Account is not set forth. In this study, we have dealt with the economics-related issues of environmental resource use in the Economic Development Account. The approach used for the Environmental Account is based on ecological principles. The primary principle is the maintenance of species and ecosystems while providing for social and economic needs.

Provincial Versus Regional Analyses

In the Interim Evaluation Guidelines, environmental impacts are evaluated on a provincial and regional basis. In order to conduct this analysis, a clear identification of how resources are used and valued by residents and non-residents in the province is required. Only then can a distinction between the two perspectives be identified. Unfortunately, the available information does not come close to the level of specificity needed to generate a relevant distinction between regional and provincial impacts. For example, there is little information on actual recreation activity for the region and even less on the proportion of that activity attributable to local and non-local markets. In fact, many of the more popular recreational sites in the region are frequented by both groups. Thus, while it is possible and relevant to identify resources and sites of significant value in general qualitative terms, to do so on both a regional and provincial basis would be unnecessary.

APPENDIX 6 - INCREMENTAL IMPACT CHANGES

SCENARIO 1									
	TSA Impacts				Provincial Impacts				
	Employment (PYs/Year)		After-Tax Income ($1992 Mill./Year)		Employment (PYs/Year)		After-Tax Income ($1992 Mill./Year)		Government Revenues ($Mill./Yr)
Year	Direct	Total	Direct	Total	Direct	Total	Direct	Total	
0	-43	-77	$-1.3	$-2.0	-48	-120	$-1.5	$-3.0	$-1.0
10	-59	-105	-1.8	-2.8	-66	-165	-2.0	-4.2	-1.3
20	-54	-97	-1.6	-2.5	-61	-152	-1.8	-3.8	-1.2
30	-48	-85	-1.4	-2.2	-53	-133	-1.6	-3.4	-1.1
40	-44	-78	-1.3	-2.1	-49	-122	-1.5	-3.1	-1.0
50	-39	-70	-1.2	-1.8	-44	-109	-1.3	-2.8	-0.9
60	-34	-61	-1.0	-1.6	-38	-96	-1.2	-2.4	-0.8
70	-4	-7	-0.1	-0.2	-4	-11	-0.1	-0.3	-0.1
80	0	0	0.0	0.0	0	0	0.0	0.0	0.0

SCENARIO 2									
	TSA Impacts				Provincial Impacts				
	Employment (PYs/Year)		After-Tax Income ($1992 Mill./Year)		Employment (PYs/Year)		After-Tax Income ($1992 Mill./Year)		Government Revenues ($Mill./Yr)
	Direct	Total	Direct	Total	Direct	Total	Direct	Total	
0	0	0	$0.0	$0.0	0	0	$0.0	$0.0	$0.0
10	-86	-155	-2.6	-4.1	-97	-242	-2.9	-6.1	-2.0
20	-66	-117	-2.0	-3.1	-73	-184	-2.2	-4.6	-1.5
30	-59	-105	-1.8	-2.8	-66	-165	-2.0	-4.2	-1.3
40	-51	-92	-1.6	-2.4	-57	-144	-1.7	-3.6	-1.2
50	-46	-82	-1.4	-2.1	-51	-128	-1.6	-3.2	-1.0
60	-16	-29	-0.5	-0.8	-18	-45	-0.6	-1.1	-0.4
70	0	0	0.0	0.0	0	0	0.0	0.0	0.0
80	0	0	0.0	0.0	0	0	0.0	0.0	0.0

SCENARIO 3									
	TSA Impacts				Provincial Impacts				
	Employment (PYs/Year)		After-Tax Income ($1992 Mill./Year)		Employment (PYs/Year)		After-Tax Income ($1992 Mill./Year)		Government Revenues ($Mill./Yr)
Year	Direct	Total	Direct	Total	Direct	Total	Direct	Total	
0	-158	-282	$-4.8	$-7.4	-177	-442	$-5.4	$-11.2	$-3.6
10	0	0	0.0	0.0	0	0	0.0	0.0	0.0
20	0	0	0.0	0.0	0	0	0.0	0.0	0.0
30	0	0	0.0	0.0	0	0	0.0	0.0	0.0
40	-50	-90	-1.5	-2.4	-56	-141	-1.7	-3.6	-1.1
50	-41	-73	-1.2	-1.9	-46	-114	-1.4	-2.9	-0.9
60	-38	-68	-1.2	-1.8	-43	-106	-1.3	-2.7	-0.9
70	-35	-63	-1.1	-1.7	-39	-98	-1.2	-2.5	-0.8
80	-2	-3	-0.1	-0.1	-2	-5	-0.1	-0.1	0.0

- The Donald mill has operated at one shift in the past, but the company believes this is not possible for an extended period of time. We are not aware of any sawmill facility in the province that has operated on one shift in the long-term.
- The sawmill is able to cut the TSA profile, but the plywood plant cannot. There is a symbiotic relationship between the plywood mill and sawmill. The plywood mill requires fuel from the Donald mill to operate its boiler for process steam, and the sawmill is supported in part by the higher returns generated by the plywood operation.

THRESHOLD

We believe that the approximate threshold levels for Evans' facilities are as follows:

- The plywood mill could operate at two shifts, thereby reducing potential consumption by 33 per cent, from 305 000 m^3 to 203 000 m^3. This assumes that the sawmill remains at current production levels and that all other factors remain unchanged.
- The sawmill could operate on one shift in the short-term, but in the long-term, because of uncertain commodity markets, high log cost, and the uncertain financial situation of the company, a higher utilization rate would have to be reached. Capacity utilization of higher than 50 per cent (i.e. 212 000 m^3) would have to be attained. However, there is some flexibility in the Donald mill for accommodating supply shortfalls - the mill does not have to run only at one shift (50 per cent capacity) or two shifts (100 per cent capacity). For example, current production is running at a 90 per cent utilization rate. Future production could be juggled among the two saws and the planer mill to adjust for a further drop in supply. However, this could result in staggered and seasonal shifting, thus disrupting the workforce and reducing labour productivity. Other production economies would also be lost. These effects, in addition to the high log cost in the region and the experience of other mills in the province, lead us to conclude that the plant could possibly function at a 75 per cent utilization rate, requiring approximately 393 000 m^3.
- For financial reasons, Evans may be able to manage a shift reduction at one plant or the other but probably not at both.
- Because of the higher profitability of the plywood plant, Evans would be more likely to accommodate supply reductions through adjustments to sawmill production rather than at the plywood plant.

Scenarios 1 and 2 are unlikely to force Evans into considering closing one of its mills in the first decade. The reduction in supply would either be made up through purchases, or the sawmill would reduce production. However, Scenario 3, which calls for an immediate 166 000 m^3 decline in harvest, would push one mill or the other, or both, to below or very near threshold levels.

However, the long run harvest level is the same under all three scenarios, so adjustments in processing capacities (including the possibility of plant closure) would have to be faced eventually, assuming that alternative sources of supply did not become available.

APPENDIX 7 - EVANS' PLANT THRESHOLD LEVEL

This section is based on discussions with representatives of Evans Forest Products and others in the B.C. forest industry. The conclusions are solely the opinions of Crane Management Consultants.

INTRODUCTION

In a community where wood manufacturing activity is distributed among many firms, the impact of a reduction in the local wood supply on wood processing activity is often assumed to follow a linear relationship. A 10 per cent reduction in cut, for example, is assumed to cause a 10 per cent reduction in processing. In Golden, this assumption may not be plausible because production is consolidated in one firm and only two mills. While small variations in supply may be modelled linearly, where larger reductions are contemplated the analysis has to recognize operating thresholds below which a facility would cease operations.

The threshold of a mill is dependent upon a multitude of variables, many of which are constantly changing. The threshold itself is therefore changing over time. Additionally, a lack of consensus on methodology and definitions, and a lack of data make any threshold analysis difficult. The following discussion does not attempt to quantify a threshold level of production for Evans' operations in the Golden TSA, but assesses possible thresholds based on a consideration of the available qualitative evidence.

In a manufacturing facility, the gap between actual output (utilization) and potential output (capacity) can be measured by the capacity utilization rate. If we can identify the utilization rate below which it is uneconomic to operate, then we have found the operating threshold. The threshold, in turn, is largely influenced by economies of scale, which refers to the relationship between a change in a firm's total inputs and the resulting level of output, when technology and all other factors are held constant[1]. Economies of scale derive from factors such as plant size, firm size, market size, and production run size.

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[1] A measure of economies of scale yields one of three situations, 1) A firm with "diseconomies of scale" spends more for additional inputs than the value of additional outputs. 2) Under "constant returns to scale", the cost of inputs equals the value of outputs. 3) "Economies of scale" are achieved when a firm continuously gains more in output than it spends to change its total inputs.

CURRENT SITUATION

The following factors are believed to affect the threshold level of Evans' operations in Golden.

Plywood Mill

- With its recent upgrade, Evans plywood plant capacity is 165 000 square feet (3/8" basis) using 305 000 m^3. The average capacity in the province is approximately 152 000 square feet and the Golden plant capacity is only 15 000 square feet smaller than the largest mill in the province. The Golden plywood mill appears to be at or near optimum plant size.
- The Golden plywood plant is operating at slightly below capacity at present, although all three shifts are running five days a week. As a comparison, of the 10 plywood mills in the interior, six are running three shifts and four are running two shifts. Thus, forty per cent of interior plywood mills are currently operating at 66 per cent capacity.
- In 1992, the return on capital to plywood plants was significantly higher than returns experienced by the lumber and pulp and paper sectors [Price Waterhouse, 1992].
- With recent and continuing capital upgrades, technology and equipment at the Golden plywood plant are relatively advanced and wood recovery rates improved.
- Harvesting costs in the Golden TSA are among the highest in the interior, making for higher input costs. Many coastal plywood plants have closed in recent years because of high log costs.
- Evans is a shareholder-operated firm with limited capital resources and high overhead expenses. Capital expenditure programs, while improving production economies, also increased capital inputs thus raising overhead costs and the minimum capacity utilization threshold for the plywood plant.
- Total demand for plywood is growing very slowly and substitute products are increasingly taking away market share, making for a unstable market.

Sawmill

- The lumber mill in Donald, with a capacity of 125 million board feet (utilizing 525 000 m^3) is larger than the industry average of approximately 90 million board feet, but much smaller than the 32 largest mills in the province, which average in the range of 175 million board feet. The Donald mill is currently running at 90 per cent capacity and is cutting dimension lumber in cedar and whitewood.

APPENDIX 8 - LOCAL RESIDENT AND TOURIST-DRIVEN OUTDOOR RECREATION ACTIVITY

The three scenarios have similar implications for tourism and outdoor recreation activities over the planning horizon. A change in timber harvest levels can have important implications for the businesses and employees who depend on tourism and outdoor recreation. Golden area forests provide significant opportunities for people to enjoy the outdoors. There is not a ready co-efficient, a formula-style relationship, between tourism/recreation employment and timber harvest, but a relationship can be attached to visitorship and recreation/tourism employment. If harvest level changes affect visitorship, outdoor recreation and tourism employment will change.

Tourism and recreation have somewhat unique products and production processes. The trip is the product, rather than recreation sites and facilities. It involves the total experience, anticipation, travel and recollection. Consumers combine the opportunities made available by nature, government and the private sector with their own knowledge, equipment, travel and technology to produce the trips. Tourists and recreationists will interpret any adverse impacts from timber harvesting and decide whether or not to go forward with a trip.

In a general sense, each scenario would similarly affect outdoor recreation and tourism opportunities because they are subject to the same forest management practises, including Ministry of Forests Integrated Resources Management (IRM) guidelines. The specific protection for biodiversity, views and habitat should prevail in the same fashion and in the same quantity for each scenario. The current harvest cannot be sustained for more than ten years without a relaxation of IRM rules or a more dramatic future timber supply falldown. Recreation and tourism activity are site-specific. If a scenario included a site-specific IRM exemption, then it might experience a consequential reduction in tourism activity; however, all scenarios for Golden TSA reference the same land base.

There are no major site-specific conflicts between logging and outdoor recreation and tourism values in the Golden TSA. The local IRM guidelines include two Protected Area Strategy (PAS) study areas[1]. This study is not an analysis of the IRM guidelines or the area to which they apply. They are taken as a given for this analysis.

The IRM guidelines provide an avenue to address visual quality to a moderate-high degree along the Trans-Canada Highway corridor (including the Mount Seven area near Golden) and to a moderate to high degree along the Highway 97 corridor. Maintenance of the visual integrity of recreational and heritage trails is a management priority, but there is no allowance for landscape quality from trail viewpoints, unless it falls within a highway corridor. No allowance is made for visual quality in other areas, with the exception of a small portion of the backcountry, where the scenic landscape is considered to be important for recreational purposes. No logging is permitted in the two PAS study areas, but there is no allowance for maintaining visual quality within the operable land base which is visible from them.

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[1] Note that the two PAS areas were included in the timber harvesting land base for the Golden Timber Supply Analysis report.

Timber cutting can improve recreation access to backwoods areas through creation of logging roads and cuts for heli-skiing runs. Over the longer term, there would be no difference between scenarios regarding access. As well, the same land base applies to all scenarios, so there will not be differences between them in terms of logging road access.

A possible difference in recreation and tourism potential between the scenarios comes from the lower near-term harvest for Scenario 3 over Scenarios 1 and 2. The immediate 25 percent drop in harvest could make it easier to manage visual and habitat impacts from timber harvesting, although specific harvesting plans under the third scenario are unknown at this time. The reduced harvest would not enhance tourism features, but it would help avoid potential problems, such as reduced visitorship, associated with the loss of these features. However, the impacts on tourism would only be experienced in the short-term, since the long run harvest is the same in all three cases. In the past, timber cutting has not appeared to hinder recreation/ tourism activity within the Golden TSA. In fact, the improved access through logging roads has encouraged recreation/tourism activity.

There is an important interpretation issue when outdoor recreation and tourism are a significant economic sector. The services of environmental resources used in the production of a trip or experience have either no price or a price which does not reflect a market value. Although the recreationist or tourist does not pay for them, they can often place a dollar value on what they would be willing to pay. There are a large number of academic studies on this issue. An example is the fishing experience, where a fisher can accurately estimate what he or she would pay for a day of fishing, above the spending on bait, fuel, food, etc. Even though he does not pay for the environmental resources which combine to yield the fishing experience, it still has economic value. There are many other examples of services or goods which do not have market prices yet provide solid economic value. An economic impact study does not record something if there is no spending. This situation leads to an understatement of the importance of recreation and tourism within the region or province.

APPENDIX 9 - GOLDEN TSA FOREST HARVESTING GUIDELINES (AUGUST, 1993)

The following are interim forest harvesting guidelines which may be revised pending completion of provincial or local strategic planning initiatives.

Minimum Harvest Age Criteria

Culmination age based upon the Variable Density Yield Projection [VDYP] will be used. The exception is for poor sites, where 120 years (Douglas-fir/pine) and 130 years (spruce, subalpine fir, hemlock, cedar) will be used.

Harvest Priority

Older age classes will be harvested before younger age classes. [The AAC rationale is based upon maximizing growth potential by logging older stands first]. It is recognized that this harvest priority has not been accomplished in the past.

High Infection Centres of Root Rot - Armillaria

All areas with Armillaria infection, even those with high levels of infection, will not be prioritized for immediate logging. Instead, they will be initially proposed, as per other cut blocks, within the last two years of the development plan.

Harvest Profile

Harvesting must be distributed throughout the TSA so that aspects of the available mature timber supply are uniformly harvested [such aspects include species, location, season and method of logging]. It is recognized that some aspects of this have not been accomplished in the past.

Riparian and Winter/Riparian Habitat - valley bottom

The riparian area is the primary component of riparian habitat or Riparian Management Zone (RMZ) and is presently the only portion that has been mapped for the Golden TSA. However, the entire RMZ, which includes the riparian area and the riparian associated forest, will be managed for in the context of the following Riparian Habitat guidelines.

Within each riparian habitat or Riparian Management Zone (RMZ), must maintain at any one time a minimum of 80 % of the net operable area in stands greater than 10 meters in height.

- Maintenance of wildlife habitat (forested thermal cover and forage for ungulates) within Riparian Management Zones will be the management objective with alternative silviculture systems emphasized [harvest will be through small group or individual tree selection where feasible].
- Maintenance of biodiversity values will be a priority objective with the aim of retention of natural structure and habitat diversity (existing plant communities, hard woods, decadent portions, some large diameter trees, snags, etc.).

- Where feasible, all wetlands and streams to have a 25 meter wind firm and machine free buffer on each side within which some volume removal may be allowed using directional falling and alternative silviculture systems, and a 5 meter no harvesting buffer on both sides of the stream to protect stream bank integrity. These are in addition to the riparian habitat requirements, for the conservation and protection of water and fisheries resources. Wind throw hazard will have to be assessed on a site specific basis when determining actual buffer width, block size and layout, and silviculture system prescribed.
- Endeavor to locate haul roads a minimum of 50 metres outside the RMZ and limit road crossings. Where roads are in the RMZ, right-of-ways should be kept to an absolute minimum (no R/W landings).

Streamside Management Zone

This applies to all streams not within designated riparian habitats. The SMZ is intended to maintain fisheries values and protect stream bank integrity. As a general guideline - Permanent streams to have a 25 meter wind firm and machine free buffer on each side within which some volume removal may be allowed using directional falling and alternative silviculture systems, depending on the fisheries value of the stream or watershed and operational harvesting considerations. A 5 metre no harvesting buffer on both sides of the stream will also be maintained, where feasible. Each stream (whether permanent or ephemeral/seasonal) will have to be assessed on an operational site specific basis when determining actual buffer width, block size and layout, and silviculture system prescribed.

Winter Habitat

Within each 250 hectare area of winter habitat, must maintain at any one time a minimum 45 % of the net operable area in thermal cover [generally stands with greater than 70 % crown closure, greater than 20 meters in height]. It is required that the 55 % net operable area not required as thermal cover be harvested in 2 passes with a 3 meter green-up between passes. Cut block size to be no greater than 15 hectares and be equally distributed between the 1 - 5, 6 - 10, and 11 - 15 hectare categories.

Management for caribou habitat is not included in these guidelines, and will therefore not affect the amount of area that can be harvested in a working cell.

Old Growth Habitat

The following guidelines apply only to the Cummins River working cells.
Ten percent of forest producing sites within each biogeoclimatic zone per working cell must be maintained at any one time as functional old growth [To allow for edge effect, this will likely require that 12 % of the net operable land base be in old growth stands].

To provide for adequate old growth distribution between timber types and ecosystem types, ensure that a minimum of half of the designated old growth within each biogeoclimatic zone/working cell unit is within the net operable land base. Note that

there is usually less than 50 percent viable old growth habitat within the inoperable land base within each biogeoclimatic zone/working cell unit.

Permanent old growth reserves should be linked together by areas of mature forest (e.g., forest cover maintained along riparian areas) to maintain habitat connectivity, to facilitate wildlife movements between old growth reserves, and to minimize the negative impacts of forest fragmentation.

Minimum size of old growth patch = 200 hectares.

Minimum width of old growth patch = no less than 350 metres at any one point.

Stand characteristics of old growth patch:

- timber types except lodgepole pine
- age classes greater than 7 (141 + years)
- height classes greater than 2 (19.5 + metres) (height class 2 will be used only as an exception)
- stocking class = 1 (mature, greater than 76 stems/hectare of greater than or equal to 27.5 cm dbh)

Maximum slope of old growth patch = 80 %.

Old growth stands will be selected to maintain a natural occurrence of leading species types within each biogeoclimatic zone/working cell unit.

Minimize road influence [must not be bisected by active road]. Active roads to be located a minimum of 50 metres from old growth stands.

Minimize the logging influence around old growth stands by using alternative silviculture systems where feasible. Minimize edge.

<u>Recreational/Heritage Trail Areas</u>
Consideration of the maintenance of the visual integrity of area immediately adjacent to these trails is required.

<u>Designated Visual Quality Objective Areas</u>
Visual quality objectives must be addressed to a level of Partial Retention or Modification in all designated areas along the Trans Canada Highway and Highway 95 corridors [maps showing the designated VQO areas are located within our District office]. Licensees must propose visual quality objectives for all other non-designated areas deemed to be visually sensitive (upper Cummins, Mummery, Pacific/Jeffrey, etc.).

<u>Basic Timber-Pass System Areas [non-winter/riparian or vqo areas]</u>

These are the areas which do not fall into any of the other categories, and as such make up the majority of the net operable land base. Within a working cell [often = an entire drainage] , the minimum green-up requirement of first pass blocks [40 % of the net operable land base[1]] must be satisfied prior to commencement of second pass harvesting [30 % of the net operable land base in the northern supply blocks (A - D), 20 % of the net operable land base in the southern supply blocks (E,F,G)]. Green-up is a minimum of free-growing within the northern supply blocks, and is a minimum of free-growing, 3 meters height and hiding cover within the southern supply blocks. Maximum cut block size is 80 hectares. Tentative working cell boundaries have been designated on maps located in our District office.

Where possible, blocks will be designed and located so that, after first and second pass, valley bottom and valley bottom to alpine movement corridors are maintained. Given the current basic timber-pass system guidelines, it will likely not be possible to maintain these corridors after third pass in many areas.

For the Beaverfoot Valley, the above Basic Timber-Pass System guidelines may not be applicable. We are currently reviewing the guidelines for this area. Please consider our past decisions regarding cut block approval for this valley when preparing your submission.

Hiding cover equals vegetation capable of hiding 90 % of a standing adult ungulate from the view of a human at a distance of 60 metres or less. Visibility is influenced by many factors which need to be considered when assessing the quality of hiding cover:

- height and density of vegetation (3 metres height of a stocked conifer stand is often acceptable);
- species of vegetation [deciduous vs. coniferous, shade tolerant vs. shade intolerant conifers];
- topographical features [eg., if a road occurs on a steep slope above an immature stand, it is easier to see into the stand from the road than if it occurs on the downslope side];
- ungulate species [height and density of vegetation suitable for cover for deer may be less than that required by larger species such as moose and elk].
- size of hiding cover patches [patches of suitable cover for elk, which travel in relatively large social groups at certain times of the year, may need to be larger than those for deer].

Avalanche Tracks

Forest cover retention of at least height class 3 and 60 percent crown closure along at least one side of avalanche track [this retention area must be large enough to form a

[1]That portion of the forest deemed to presently contain mature forests that are (or immature forests/non-stocked areas that will be) economical for harvest, given current economic conditions and technology. This land base generally does not include area above the operability line and low site classes, includes 10 % of ESA areas below the operability line and a certain percentage of hemlock and subalpine fir leading problem forest types (40 % of Hw types, 70 % of Hw leading types, and 80 % of BS types).

viable future cut block]. Where feasible, the logged side should have some mature trees left standing. Forest cover retention of naturally occurring narrow strips situated between groups of avalanche tracks.

Stand Level Diversity

The primary objective of managing for structural diversity within forest stands is to maintain diverse habitats for a wide variety of wildlife species. It is particularly important to manage for structural diversity within 1) second pass blocks adjacent to previously cutover first pass areas which often lack structural diversity, and 2) other blocks (including first pass blocks) as agreed on a site-specific basis with the B.C. Environment Forest Ecosystem Specialist.

Structural features considered to be most important in maintaining biodiversity are:

1. Dead and dying wood [*snags, wildlife trees, coarse woody debris];
2. Large and old trees[living trees for snag recruitment];
3. Vertical and horizontal structure[several canopy layers]; and,
4. Herb and shrub communities.

Where management for the above features occurs (see above), there must also be prime consideration for the effect upon timber volume production. Also, blocks will be chosen for management of stand level diversity in consideration of the potential effects upon hazard abatement, insects and disease and blowdown.

In many instances, management for stand level diversity will result in lower recovered volumes per hectare, slower managed stand growth rates, which may decrease the long-term timber harvest level and the time to green-up. Over the TSA, management for these features will not occur so as to decrease height and volume growth rates by more than 5 %. If it is assumed that on cutblocks where management for stand level diversity occurs there will be a 20 % decrease in height/volume growth, then 25 % of all cutblocks can have stand level diversity applied to them. It is recommended that this 25 % be distributed within 1000 net operable hectare units.

*WCB standards may preclude this is some cases.

At present, features 2. and 3. above will primarily be managed for via silviculture systems other than clear-cutting, where feasible.

The 'Provincial Harvesting Guidelines for the Management and Maintenance of Wildlife Trees' is the best available summary for snag and wildlife tree management.

For coarse woody debris, the general objective is to maintain a representation of the full range of sizes of coarse woody debris that existed prior to harvesting. In general, large diameter debris [>30 cm] provides better habitat for a wider range of species than smaller debris. If possible, the natural distribution of coarse woody debris should be maintained, although piles of debris provide habitat for some species [several small piles are better than a few large ones]. If prescribed burning is applied, use the minimum intensity burn feasible to meet burn objectives. Where feasible, avoid

consuming or case hardening the large materials. (It is expected that broadcast burning will often not be employed on stands managed for stand level diversity- stands with high hazard abatement requirements will often not be chosen for stand level diversity management).

Maintaining vertical and horizontal structural diversity can be achieved by: leaving patches of advanced regeneration; maintaining the full range of naturally occurring tree species; leaving deciduous trees; managing for representative shrub communities on a portion of a block.

APPENDIX 10 - PROVINCIAL GOVERNMENT REVENUE IMPACT METHODOLOGY

Provincial government revenues related to the Golden TSA harvest are grouped into three categories:

Resource Revenues - These include stumpage, rent and royalties. The weighted '89-'91 average for Golden TSA volumes of the Interior target SPF stumpage rate and SBFEP bid prices is $7.95 per m^3 [Ministry of Forests, Golden Forest District 1992]. Other rents and royalties are assumed to be $0.99 per m^3. The total resource revenue per m^3 is therefore $8.94 [Ministry of Forests 1991].

Personal Income Taxes - Effective employment income tax rates are assumed to be 26.2 per cent for forestry income, 20.2 per cent for other Golden income, and 20.5 per cent for other provincial income. The provincial share of these is assumed to be one third (the federal government share is two thirds).[1]

Other Taxes - These comprise corporate, logging, property, sales and electricity taxes. The B.C. government is assumed to receive $5.80 per m^3 from these sources [Ministry of Forests 1993].

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[1] The amount of personal income tax is difficult to project. Job losers would have lower incomes, at least for a short time. The majority would secure other work, but perhaps not in the forest industry. Assuming no income for job losers would be incorrect. Further, there is the difficulty of making assumptions about BC government expenditures to determine the total net fiscal effect for the province.